No. 2013-1445

IN THE
United States Court of Appeals
FOR THE FEDERAL CIRCUIT

DATCARD SYSTEMS, INC.,

Plaintiff-Appellant,

v.

PACSGEAR, INC.,

Defendant-Appellee.

APPEAL FROM THE UNITED STATES DISTRICT COURT
FOR THE CENTRAL DISTRICT OF CALIFORNIA IN
CASE NO. 10-CV-1288, SENIOR JUDGE MARIANA R. PFAELZER

BRIEF OF PLAINTIFF-APPELLANT DATCARD SYSTEMS, INC.

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July 24, 2013

CERTIFICATE OF INTEREST

Counsel for Plaintiff-Appellant DatCard Systems, Inc. certifies the following:

1. The full name of every party being represented by me is:

DatCard Systems, Inc.

2. The real party in interest represented by me is:

DatCard Systems, Inc.

3. All parent corporations and any publicly held companies that own 10 percent or more of the stock of the parties represented by me are as follows:

None.

4. The names of all law firms and the partners or associates that appeared for the party now represented by me in the trial court or agency or are expected to appear in this Court are:

Craig S. Summers, Paul A. Stewart, Brian C. Claassen, Bridget A. Smith, KNOBBE, MARTENS, OLSON & BEAR, LLP, 2040 Main Street, 14th Floor, Irvine, CA 92614.

Dated: July 24, 2013

By: */s/ Paul A. Stewart*
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STATEMENT OF RELATED CASES

There are no related cases in this Court or in any other Court of Appeals. The case of *DatCard Systems, Inc. v. Data Distributing LLC*, Civil Action No. 11-CV-10434-MRP (VBKx), is pending before the United States District Court for the Central District of California. That case involves the same patents that are at issue on this appeal and thus that case is likely to be affected by this Court's construction of the claims of those patents.

JURSIDICTIONAL STATEMENT

The District Court had jurisdiction over this patent infringement case under 28 U.S.C. § 1338. The District Court entered final judgment in this case under Rule 54(b) of the Federal Rules of Civil Procedure on June 7, 2013. A1-A4. Accordingly, this Court has jurisdiction under 28 U.S.C. § 1295(a)(1).

I. STATEMENT OF THE ISSUES

1. Did the District Court err in construing the terms "related data" and "additional medical data" to be limited to images and other data that is stored "in a standard medical imaging format" where (a) the specification and prosecution history contain no limiting definition or disclaimer of the claim terms, and (b) the claims of the parent patent ***did*** require data to be stored "in a standard medical imaging format," but this requirement was omitted from the claims of the continuation patents at issue on appeal?

2. Did the District Court err in granting summary judgment of no infringement where (a) its literal infringement ruling was based upon its erroneous construction of "related data" and "additional medical data," and (b) its doctrine of equivalence ruling was based upon no evidence or argument at all?

3. Did the District Court err in construing the term "automatically" to preclude the checking of a box during the initial set-up of a computer system?

4. Did the District Court err in denying DatCard's cross-motion for summary judgment of infringement of the '174 Patent based entirely upon its construction of "related data" and "automatically"?

II. STATEMENT OF THE CASE

DatCard Systems, Inc. filed suit against Pacsgear, Inc. alleging infringement of five patents invented by two of DatCard's founders, Ken Wright and Chet LaGuardia. A259-A268. Each of the patents discloses and claims a device for recording medical images and other information onto portable storage media such as CDs and DVDs. A106-A258. DatCard markets its PacsCube® device under these patents, and has done so since DatCard's founding in 2000. A3030, A3126-A3129. DatCard alleges that Pacsgear's competing MediaWriter device infringes its patents. *See* A262 ¶17, A263 ¶23.

In January 2012, following the completion of discovery, the parties filed cross-motions for summary judgment. Most relevant here, Pacsgear sought summary judgment that U.S. Patent Nos. 7,783,174 ("the '174 Patent") and 7,729,597 ("the '597 Patent") are not infringed, and DatCard sought summary judgment that the '174 Patent is infringed. A1391-A1420, A2042-A2067.

The District Court elected to address the summary judgment motions in two stages. First, on October 26, 2012, the District Court issued a claim construction ruling for all five patents-in-suit. A5-A39. Then, on March 12, 2013 and April 1, 2013, the District Court issued its final rulings on the summary judgment motions. A40-A85. In those final rulings, the District Court

held that Pacsgear did not infringe the ’174 and ’597 Patents. A81-A85. The District Court also held that DatCard’s three remaining patents were either invalid or not infringed. A40-A60, A68-A85.

DatCard now appeals the District Court’s grant of summary judgment of non-infringement of the ’174 and ’597 Patents, and the denial of summary judgment of infringement of the ’174 Patent. DatCard does not appeal the District Court’s other summary judgment rulings.

III. STATEMENT OF THE FACTS

A. Medical Disc Publishers

In the 1990s and earlier, most hospitals used film to store images taken by X-Ray, MRI, and other imaging devices. A191 at 1:30-35, A2960, A3126. However, some hospitals in the 1990s were slowly beginning the process of moving toward a computerized, filmless environment. The first step toward the elimination of film was the acquisition of a Picture Archiving and Communications System, known as a PACS. A PACS is a large computer capable of storing thousands of patient images. A191 at 1:45-50.

Typically, a PACS is connected electronically to a wide array of imaging devices or “modalities,” such as devices for taking X-Rays, MRIs, ultrasounds, and other types of images. In modern hospitals, these devices take images

digitally. A191 at 1:36-40. The digital images then may be communicated electronically to a PACS where the images are stored. To allow a PACS to communicate effectively with imaging modalities, a standard medical imaging format was developed. This format is known as DICOM, an acronym for Digital Imaging and Communications in Medicine. A191 at 1:52-56. The images generated by digital imaging devices and stored in a PACS are stored in the standard DICOM format. A191 at 1:63-64.

The introduction of the PACS and digital imaging devices provided significant savings in storage space, as hospitals no longer needed to store film images in large film libraries. However, it was still necessary to print individual images onto film whenever a physician needed to provide a copy of a patient's image to the patient or to a physician at a different facility. A2961, A3028.

To overcome this problem, devices known as medical disc publishers were developed. These devices electronically retrieved DICOM images from a PACS and burned those images to a CD or DVD. The first medical disc publishers were quite crude. A3031, A3126. The CD or DVD had to be loaded by hand into a disc drive. A3126. The disc included only the patient's images, and not the related report that contained the radiologist's analysis of the images. *Id.* In addition, the patient's name and other identifying data had to be written

by hand onto the disc. *Id.* Further, the disc could be reviewed only on specialized computers that included the software necessary to view DICOM images. *Id.*

B. DatCard And Its Pacscube® Medical Disc Publisher

DatCard was founded in 2000 to develop and market a vastly improved medical disc publisher. The result was DatCard's flagship Pacscube® product, which has been the industry leading medical disc publisher since shortly after its introduction in December 2000. The Pacscube® was developed by Ken Wright, the President of DatCard, and Chet Laguardia, DatCard's Chief Operating Officer.

The Pacscube® overcomes each of the deficiencies present in the early medical disc publishers described above. The Pacscube® is an automated medical disc publisher that includes a "production station" that robotically loads and unloads CDs and DVDs into a disc drive to burn images onto the disc. In addition, the Pacscube® retrieves the radiologist's report and other information related to the patient's images and burns that data to the disc as well. The patient's name and other identifying information are automatically printed onto the disc at the production station. And the disc can be viewed on essentially any computer because the specialized software needed to view DICOM images is

included on the CD or DVD with the images themselves. A3030-A3031, A3126-A3129.

The PacsCube® truly revolutionized the medical disc publishing industry. A3126. When the PacsCube® was introduced in 2000, it was the norm for patients to receive their images on film. Today, based entirely on the PacsCube® and its imitators, the film-based environment of the past is rapidly disappearing. *Id.* It is now routine for patients and physicians to receive DICOM medical images on a CD or DVD. *Id.* The unwieldy practice of carrying films from facility to facility is largely a thing of the past. *Id.* Simply put, the Pacscube® changed the technological landscape for the distribution and viewing of medical images and reports. *Id.*

C. DatCard's Patents

DatCard has taken all reasonable steps to protect the various inventions embodied in the Pacscube® device, obtaining a family of patents directed to many features of the Pacscube®. The first of these patents was U.S. Patent No. 7,302,164 ("the '164 Patent"), one of the patents that was at issue in the District Court but is not at issue here. The '164 Patent, however, is the parent of the two patents on appeal, and the content of the '164 Patent is therefore relevant to the issues on this appeal.

The ’164 Patent describes and claims many of the features of the Pacscube® device described above. In particular, the ’164 Patent describes an automated medical disc publisher that includes a “production station” that robotically loads and unloads CDs and DVDs into a disc drive to burn images onto the disc. A115 at 4:34-39. The ’164 Patent further explains that the patient’s name and other identifying information are automatically printed onto the disc at the production station. A116 at 6:27-36. In addition, the ’164 Patent explains that the disc can be viewed on essentially any computer because the specialized software needed to view DICOM images is included on the CD or DVD with the images themselves. A116 at 6:4-12.

Finally, the ’164 Patent addresses the problem of obtaining information related to the patient’s images and placing it onto a disc along with the images. “One embodiment of the claimed system allows for searching medical exam data that are related [to the images to be burned to a disc] and placing such data on the same CD.” A114 at 2:7-9. The ’164 Patent also describes another embodiment in which additional images that are related to the selected image are recorded to the disc along with the originally selected image. A114 at 2:38-52, A115 at 4:44 – A116 at 5:19. This embodiment is described in greater detail because of its technological complexity.

These same improvements are recited in the claims of the ’164 Patent. Claim 9 is representative and reads as follows:

> 9. A system comprising:
>
> [1] a medical image server configured to receive medical image data that is generated by a plurality of imaging modalities, the medical image data being formatted in a standard medical imaging format used by specialized computers configured for viewing medical images;
>
> [2] a database configured to store medical image data generated by the plurality of imaging modalities;
>
> [3] a plurality of browsing terminals configured to receive a user selection that defines selected medical image data;
>
> [4] a search module configured to search the database for ***related medical image data*** that is related to the selected medical image data; and
>
> [5] a production station that is configured to record all of the following onto a data storage medium:
>
> [a] the selected medical image data, recorded in the standard medical imaging format,
>
> [b] the related medical image data, ***recorded in the standard medical imaging format***, and
>
> [c] a viewing program that is configured to allow viewing of the selected and related medical image data that is recorded onto the data storage medium on widely accessible computers not specifically configured with standard medical imaging software for viewing of medical images.

A135 at Claim 9 (emphases added).

In operation, the user of the claimed medical disc publisher selects an image to be burned to a disc using one of the "browsing terminals" of element 3. The search module of element 4 then searches a database for "related medical image data" that is related to the selected image data. Finally, the production station of element 5 creates a disc that includes [a] the selected image data, [b] the related medical image data, and [c] a viewing program that allows the images to be viewed on essentially any computer.[1]

After obtaining the '164 Patent, DatCard realized that additional patent protection was necessary to properly protect its invention. In particular, DatCard recognized that the highlighted phrase "related medical image data" may be construed more narrowly than DatCard intended. The phrase was intended to encompass any data related to the selected medical image data, such as the radiologists' reports that are retrieved by DatCard's PacsCube® device. However, it could be construed as limited only to other ***images*** that are related to the selected medical images. In addition, Claim 9 requires that the "related medical image data" be "recorded in the standard medical imaging format" such as DICOM. This, too, could unduly limit the scope of Claim 9 because

[1] Claim 9 does not specifically address the automated labeling of the disc. That is addressed in other claims, such as dependent Claim 11 and independent Claim 16.

radiologists' reports are not always recorded in a standard medical imaging format.

Accordingly, DatCard sought additional patent protection through the filing of continuation applications. As a result, DatCard obtained the '174 and '597 Patents, along with other continuation patents that are not at issue on this appeal.

The primary purpose of the '174 Patent was to overcome the problems identified above raised by the claim language "related medical image data" and "recorded in the standard medical imaging format." In the claims of the '174 Patent, DatCard replaced the phrase "related medical image data" with the simple phrase "related data." And DatCard deleted altogether the requirement that this data be "recorded in the standard medical imaging format." As a result, representative Claim 1 reads as follows:

> 1. A system comprising:
>
> [1] a medical image server configured to receive medical image data generated by one or more imaging modalities, the medical image data being formatted in a standard medical imaging format;
>
> [2] a database configured to store medical image data generated by the one or more imaging modalities;
>
> [3] a plurality of browsing terminals configured to receive a user selection that defines selected medical image data for a patient;

> [4] a search module configured to automatically search the database for ***related data*** based on the user selection; and
>
> [5] a production station that is configured to record all of the following onto a data storage medium:
>
> [a] the selected medical image data, recorded in the standard medical imaging format,
>
> [b] the ***related data***, and
>
> [c] a viewing program that is configured to allow viewing of medical image data that is recorded onto the data storage medium by a general purpose computer that is not specifically configured with medical imaging software for viewing of medical images formatted in the standard medical imaging format.

A195 at Claim 1 (emphases added). As can be seen, element 5[b] does not require that the "related data" be recorded in "the standard medical imaging format."

The claims of the '597 Patent address a slightly different aspect of DatCard's invention than the claims of the '164 and '174 Patents. In the '597 Patent, the medical disc publisher searches a first database for medical image data selected by the user. A167 at 9:29-31. The medical disc publisher then searches a second database for "additional medical data" related to the patient. *Id.* at 9:34-38. Thus, the selected medical images and the additional medical

data are located in separate databases, a requirement not present in the ’164 and ’174 Patents.

As with the ’174 Patent, the phrase “related medical image data” does not appear in the claims of the ’597 Patent. Instead, the phrase “additional medical data” is substituted in its place. Similarly, as with the ’174 Patent, there is no requirement in the ’597 Patent that this data be recorded in a standard medical imaging format such as DICOM.

Method Claim 1 of the ’597 Patent is representative and reads as follows:

> 1. A computer-implemented method for automatically generating a portable computer-readable medium containing medical data related to a patient, comprising:
>
> [1] receiving, via computer-implemented interface a request for medical data related to the patient;
>
> [2] automatically searching a first computer database via a first database interface for a first set of medical imaging data related to the patient based on the received request;
>
> [3] automatically retrieving the first set of medical imaging data related to the patient;
>
> [4] automatically searching, based on the received request, a second computer database via a second database interface for ***additional medical data*** also related to the patient, wherein the second interface is different from the first interface;
>
> [5] automatically receiving the additional related medical data; and

> [6] automatically generating a portable computer-readable medium, at a production station, containing the first set of medical imaging data related to the patient and the additional related medical data, wherein the first set of medical imaging data is formatted in a standard medical imaging format used by a computer configured for viewing the medical imaging data.

A167 at Claim 1 (emphasis added).

D. Pacsgear's MediaWriter Device

Pacsgear sells its MediaWriter medical disc publisher in competition with DatCard's PacsCube® product. The MediaWriter includes a computer terminal through which users select the medical images of a patient. A2047. The MediaWriter then searches for radiologists' reports relating to the selected medical images. A2048. These reports are at least sometimes provided to the MediaWriter in the DICOM format. A5534, A5542 (reports retrieved from a "Mitra broker" are communicated in the DICOM format); A5595 at lines 21-23 (MediaWriter retrieves reports from a Mitra broker). The MediaWriter then robotically loads a CD or DVD into a disc burner. A1458, A1498. The MediaWriter burns both the selected images and the related radiologists' reports to the disc, along with a viewing program that allows ordinary computers to view the DICOM images on the disc. A2048-A2049, A1970-A1971. The MediaWriter also prints the patient's name and other identifying information onto the surface of the disc. A2049, A1477-A1479, A1514-A1518.

The user of a MediaWriter has the ability to turn on or off the feature that allows for the automatic search for radiologists' reports and the automatic burning of these reports to a disc. To turn the feature on, the user or installer checks a box entitled "Enable Reports" during the initial set up of the MediaWriter. A1521. Also during the initial set up, the user also checks a box entitled "Include Reports By Default." *Id*. Thereafter, the MediaWriter always searches for radiologists' reports and burns those reports to a disc whenever the user chooses to burn patient images to a disc. *Id.*

If the "Include Reports By Default" box is ***not*** checked during initial set up, the user still can choose to burn reports to a disc on a job-by-job basis. To do this, the user simply selects a patient's image. A dialog box will then appear with a check box entitled "Include Reports." A1509, A2048-A2049. The user simply checks this box, and radiologists' reports will be included with the patient's image on the disc. A1510, A2048-A2049.

Pacsgear introduced the search for radiologists' reports in Version 3.0 of the MediaWriter, launched in May 2010. A1787-A1789. DatCard has accused Version 3.0 and all subsequent versions of infringement of the '174 and '597 Patents. DatCard does not contend that the earlier versions, which did not search for or record radiologists' reports, infringe its patents.

E. The Proceedings Below

On January 16, 2012, Pacsgear filed a motion for summary judgment of non-infringement of the ’174 and ’597 Patents.[2] A2042-A2067. That same day, DatCard filed a cross-motion for summary judgment of infringement of the ’174 Patent.[3] A1391-A1420. On October 26, 2012, the District Court issued an order addressing the claim construction issues raised by the parties’ summary judgment motions. A5-A39. Subsequently, on April 1, 2013, the District Court issued its orders applying its claim constructions to the remaining issues raised by the parties’ summary judgment motions. A61-A67, A81-A85. Based upon its claim construction rulings, the District Court granted Pacsgear’s motion for summary judgment of non-infringement of the ’174 and ’597 Patents; and the District Court denied DatCard’s motion for summary judgment of infringement of the ’174 Patent. *Id*.

[2] In that same motion, Pacsgear also sought summary judgment of non-infringement of the ’164 Patent. That portion of Pacsgear’s motion is not at issue on this appeal. On the same day, Pacsgear also filed additional motions for summary judgment which are also not at issue on this appeal.

[3] DatCard’s motion also sought summary judgment of infringement of one additional patent. That portion of DatCard’s motion is not at issue on this appeal.

1. Pacsgear's Motion for Summary Judgment of Non-Infringement of the '174 Patent

The District Court's grant of summary judgment of non-infringement of the '174 Patent was based entirely upon its construction of a single claim term, "related data." The District Court began by observing that the term "related data" has "fewer modifiers" than the phrase "related medical image data" which appears in the parent of the '174 Patent. A15. "This might seem, at first blush," the court acknowledged, "to support a broader construction for the former claim terms than the latter." *Id*. However, the Court ultimately rejected this position and held that the term "related data" in the '174 continuation patent had exactly the same scope as the term "related medical image data" in the '164 parent patent. In both cases, the Court concluded, the claim term is strictly limited to images and other "data in a standard medical imaging format." A19, A38. Thus, the Court concluded, the term "related data" "exclude[s] a radiologist's text reports unless they are stored in a standard medical imaging format." A20.

In support of this conclusion, the District Court expressed its view that "the Court must pay close attention to the specification when construing a claim term in a continuation." A15. The District Court cited no case law for this proposition, but instead relied entirely upon a scholarly article warning that continuation applications may be abused in some cases. *Id*. at n.2 (citing Mark

A. Lemley & Kimberly A. Moore, *Ending Abuse of Patent Continuations*, 84 B.U.L. Rev. 63 (2004)). This article, moreover, says nothing about giving the specification extra weight in the construction of claims of a continuation patent.

The District Court also relied upon the dissenting opinion in *Arlington Industries, Inc. v. Bridgeport Fittings, Inc.*, 632 F.3d 1246 (Fed. Cir. 2011), to support its approach to claim construction. *See* A16. In that dissenting opinion, the dissenting judge observed that "The specification is the heart of the patent." *Id.* (quoting *Arlington Industries*, 632 F.3d at 1257 (Lourie, J., dissenting)). Thus, the dissent concluded, "***you should get what you disclose***." *Id.* (emphasis added by District Court).

The District Court acknowledged that the *Arlington Industries* majority disagreed with the dissent's approach. *Id*. As the majority explained for this Court:

> [The dissent] characterizes the specification as the "heart of the patent" and, using "colloquial terms," states that "you should get what you disclose." This devalues the importance of claim language in delimiting the scope of legal protection. "Claims define and circumscribe, the written description discloses and teaches." *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336,

> 1347 (Fed. Cir. 2010) (en banc). To use a colloquial coined by Judge Rich, "***the name of the game is the claim***."

Arlington Industries, 632 F.3d at 1255-56 n.2 (emphasis in original, some citations omitted).

Nevertheless, the District Court followed the dissent's approach, holding that it would permit only "a grant of patent protection that ends at what the patentee disclosed and described in the specification." A19-A20. The Court thus confined the term "related data" to what it perceived to be the "data" described in the preferred embodiment – images and other data that are "stored in a standard medical imaging format" such as DICOM. A20; *see also* A38.

In its summary judgment ruling, the District Court confirmed its fidelity to the approach taken by the *Arlington Industries* dissent. The Court stated that it had construed "related data" as being "limited to data in a standard medical imaging format because that is what the patentee disclosed as the invention. ***The patentee should get what he disclosed.***" A85 (emphasis added).

The District Court also held as a factual matter that the radiologists' reports retrieved by Pacsgear's MediaWriter are not stored in a standard medical imaging format because they "are merely textual data." A84. The Court did not cite any evidence in support. Instead, it cited only DatCard's general description

of radiologists' reports in its brief as "textual data." *Id.* The Court did not mention DatCard's evidence that at least some radiologists' reports are indeed provided to the MediaWriter in the standard DICOM medical imaging format, even though they may originate as "textual data." *See* A5534, A5542 (Mitra brokers communicate in DICOM format).

2. Pacsgear's Motion for Summary Judgment of Non-Infringement of the '597 Patent

The District Court's grant of summary judgment of non-infringement of the '597 Patent similarly was based entirely upon its construction of a single claim term, "additional medical data." The Court held that "additional medical data," like "related data" and "related medical image data," was limited to images and other data recorded in a standard medical imaging format. A15-A20, A84-A85. Because the Court believed the radiologists' reports retrieved by the MediaWriter were not in the standard medical imaging format, despite DatCard's evidence to the contrary, the Court held that the MediaWriter did not infringe the '597 Patent. A84-A85.

3. DatCard's Cross-Motion for Summary Judgment of Infringement of the '174 Patent

The District Court also denied DatCard's cross-motion for summary judgment of infringement of the '174 Patent. The District Court relied in part on

its construction of "related data," discussed above. A63-A64. However, the District Court also relied upon its construction of the claim term "automatically," *id.*, which appears in the limitation "a search module configured to ***automatically*** search the database for related data based on the user selection." A195 at 9:35-36 (emphasis added). The District Court's denial of DatCard's cross-motion thus raises a second issue not raised directly by the Court's grant of Pacsgear's motion.

DatCard argued that the District Court should adopt the construction of "automatically" adopted by this Court for a computer-implemented invention in *CollegeNet, Inc. v. ApplyYourself, Inc.*, 418 F.3d 1225, 1235 (Fed. Cir. 2005). A1406-A1408. In that case, this Court rejected a narrow construction of "automatically" as a "process that occurs without human intervention." *CollegeNet*, 418 F.3d at 1235. Instead, relying upon the ordinary meaning of "automatically," this Court construed "automatically" to mean that "once initiated, the function is performed by a machine, without the need for manually performing the function." *Id.* This definition allows the user to initiate the automatic function.

The District Court rejected the *CollegeNet* construction without even citing the case. Instead, it held that "automatically" means "performing the

claim steps beginning with 'automatically' ***without*** first asking for user selection or direction for ***each step***." A25 (emphases in original). The District Court then applied its construction to the MediaWriter device. The Court held that the MediaWriter avoided infringement because a box must be checked by the user in order for the MediaWriter to retrieve radiologists' reports. A64. Accordingly, for this second reason, the District Court denied DatCard's motion for summary judgment of infringement of the '174 Patent.

IV. SUMMARY OF ARGUMENT

The District Court's grant of summary judgment of non-infringement of the '174 and '597 Patents was based upon a fundamentally flawed claim construction analysis. The Court was presented with two ordinary, simple phrases – "related data" and "additional medical data." The District Court should have begun its analysis with the ordinary meaning of these ordinary, non-technical phrases. It did not. Instead, the District Court began and ended its claim construction analysis with a review of the specification.

Moreover, the District Court badly misused the specification. The District Court found no limiting definition of the disputed claim terms nor any disavowal of claim scope. Nevertheless, the District Court concluded that the broad and simple terms "related data" and "additional medical data" were limited strictly

to images and other data that are "stored in a standard medical imaging format." The only reason identified by the Court for this construction was the fact that the "data" disclosed in the most preferred embodiment of the specification consisted of images and other data stored in the DICOM format. "[P]atent protection," the Court concluded, "ends at what the patentee disclosed and described in the specification." A19-A20. "The patentee should get what he disclosed." A85.

As a result, the District Court improperly read a limitation from the specification into the claims. What is more, this limitation – "stored in a standard medical imaging format" – appears ***only*** in the claims of the '164 parent patent. DatCard obtained its '174 and '597 continuation patents precisely to eliminate this unnecessary limitation that inadvertently risked exclusion of even DatCard's commercial embodiment. The District Court nevertheless read this limitation from the parent claims into the continuation claims, apparently out of a concern that it was somehow improper to use continuation patents to correct potential errors in the parent or otherwise obtain broader patent protection.

The District Court similarly erred in its construction of the claim term "automatically." The Court again ignored the ordinary meaning of this common word, and even ignored this Court's precedent defining the ordinary meaning of

"automatically" in the context of a computer-implemented invention. Instead, the Court again resorted to the specification as the beginning and end of its analysis. Based on its reading of the specification, the District Court held that a computerized system is not "automatic" if the user or installer of the system must check a box during the initial installation of the system. This strained construction is not supported by the specification and is clearly contrary to the ordinary meaning of "automatically."

Accordingly, this Court should correct the District Court's erroneous construction of "automatically." In addition, because the District Court's denial of DatCard's cross-motion for summary judgment of infringement of the '174 Patent was based entirely upon the District Court's erroneous constructions of "related data" and "automatically," this Court should reverse the denial of DatCard's cross-motion.

V. ARGUMENT

This Court reviews summary judgment decisions by applying the standard of review of the relevant regional circuit, here the Ninth Circuit. *Brilliant Instruments, Inc. v. GuideTech, LLC*, 707 F.3d 1342, 1344 (Fed. Cir. 2013). The Ninth Circuit reviews the grant of summary judgment *de novo*. *Id.* "At the summary judgment stage, we credit all of the nonmovant's evidence and draw all

justifiable inferences in its favor." *Id.* This Court also reviews the District Court's underlying claim construction ruling *de novo. Cybor Corp. v. FAS Technologies, Inc.*, 138 F.3d 1448, 1451, 1454-55 (Fed. Cir. 1998) (en banc).[4]

A. This Court Should Reverse The Grant Of Summary Judgment Of Non-Infringement Of The '174 And '597 Patents

1. The District Court Based Its Ruling Entirely Upon Its Clearly Erroneous Construction Of "Related Data" And "Additional Medical Data"

"[A] claim construction analysis must begin and remain centered on the claim language itself." *Innova/Pure Water, Inc. v. Safari Water Filtration Sys.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004). Accordingly, "the words of a claim 'are generally given their ordinary and customary meaning.'" *Phillips v. AWH*

[4] This Court is reconsidering the *de novo* standard of review for claim construction in *Lighting Ballast Control LLC v. Philips Electronics North America Corp.*, Appeal No. 2012-1014 (Fed. Cir. March 15, 2013) (en banc). However, regardless of the outcome of *Lighting Ballast Control*, the *de novo* standard of review should apply in the circumstances of this case. The District Court based its claim construction entirely upon its legal conclusion that claims, at least in a continuation patent, must be limited to the preferred embodiments disclosed in the specification. The District Court made no determination as to the ordinary meaning of claim terms from the perspective of one of ordinary skill in the art. Nor did the District Court weigh or even consider any expert testimony. Simply put, the District Court made no decisions that could be characterized as factual or quasi-factual in nature. The District Court's decision was a quintessential legal ruling that is entitled to no deference.

Corp., 415 F.3d 1303, 1312 (Fed. Cir. 2005) (*en banc*) (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). There is a heavy presumption that the ordinary meaning applies. *Golight, Inc. v. Wal-Mart Stores, Inc.*, 355 F.3d 1327, 1332 (Fed. Cir. 2004); *accord Epistar Corp. v. Int'l Trade Comm'n*, 566 F.3d 1321, 1334 (Fed. Cir. 2009). "There are only two exceptions to this general rule: 1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of a claim term either in the specification or during prosecution." *Thorner v. Sony Computer Entm't Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012) (citing *Vitronics*, 90 F.3d at 1580).

This is a "stringent standard." *Aventis Pharma S.A. v. Hospira, Inc.*, 675 F.3d 1324, 1330 (Fed. Cir. 2012). "To act as its own lexicographer, a patentee must 'clearly set forth a definition of the disputed claim term' other than its plain and ordinary meaning. It is not enough for a patentee to simply disclose a single embodiment or use a word in the same manner in all embodiments, the patentee must 'clearly express an intent' to redefine the term." *Thorner*, 669 F.3d at 1365 (citations omitted).

"The standard for disavowal of claim scope is similarly exacting." *Id.* at 1366. "The patentee may demonstrate intent to deviate from the ordinary and

accustomed meaning of a claim term by including in the specification expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope." *Id*. "Mere criticism of a particular embodiment encompassed in the plain meaning of a claim term is not sufficient to rise to the level of clear disavowal." *Id*. "It is likewise not enough that the only embodiments, or all of the embodiments, contain a particular limitation. We do not read limitations from the specification into claims; we do not redefine words. Only the patentee can do that. To constitute disclaimer, there must be a clear and unmistakable disclaimer." *Id*. at 1366-67.

The District Court failed to adhere to these basic principles of claim construction. Instead, the District Court entirely disregarded the ordinary meaning of the terms "related data" and "additional medical data," and substituted in their place the preferred embodiment from the specification that was described in the greatest detail.

a. The Ordinary Meaning Of "Related Data" And "Additional Medical Data"

Claim construction must begin with the ordinary meaning of the disputed claim term. *Innova/Pure Water*, 381 F.3d at 1116. The District Court, unfortunately, did not even address the ordinary meaning of "related data" or "additional medical data." Instead, the District Court's analysis of the meaning

of "related data" and "additional medical data" began and remained centered on the specification. A15-A20.

However, the ordinary meaning of the claim terms is clear. "Related data" quite obviously is data that is related to something. The context of the claims, moreover, makes clear what the data must be related to. Claim 1 of the '174 Patent, for example, calls for:

> a plurality of browsing terminals configured to receive a user selection that defines ***selected medical image data*** for a patient;
>
> a search module configured to automatically search the database for ***related data*** based on the user selection.

A195 at 9:32-36 (emphases added). As the emphasized language makes clear, the "related data" must be related to the "selected medical image data." Thus, the ordinary meaning of "related data," in the context of the claims, is "data that is related to the selected medical image data." Pacsgear has never offered any alternative ordinary meaning, and neither did the District Court.

Similarly, the ordinary meaning of "additional medical data," which appears in the '597 Patent, is medical data that is in addition to some other data. Again, the context of the claims makes clear what the data must be in addition to. Claim 1 of the '597 Patent, for example, calls for:

> automatically searching a first computer database via a first database interface for ***a first set of medical imaging data*** related to the patient based on the received request;
>
> * * *
>
> automatically searching, based on the received request, a second computer database via a second database interface for ***additional medical data*** also related to the patient, ….

A167 at 9:29-38 (emphases added).

As the emphasized language makes clear, the "additional medical data" must be in addition to the "first set of medical imaging data." Thus, the ordinary meaning of "additional medical data," in the context of the claims, is "data that is in addition to the first set of medical imaging data." Once again, Pacsgear never offered any alternative ordinary meaning, and neither did the District Court.

b. <u>The Specification</u>

The common specification of the '174 and '597 Patents contains no definition of "related data" or "additional medical data." Nor does it include a clear disavowal of the scope of these claim terms. Neither the District Court nor Pacsgear ever even suggested that such a definition or disavowal was present in the specification. Accordingly, the specification provides no basis for departing from the ordinary meaning of "related data" or "additional medical data." *Aventis*, 675 F.3d at 1330; *Thorner*, 669 F.3d at 1365.

The District Court nevertheless based its construction entirely upon the specification of the patents. The Court stated that "This specification only describes an invention where 'data' in 'related data' or 'additional [related] medical data' is stored in a standard medical imaging format." A19. Based entirely upon this observation, the District Court concluded that "related data" and "additional medical data" must be strictly limited to images and other data "stored in a standard medical imaging format." *Id*.

The District Court thereby erred as a matter of law. DatCard plainly did not use the specification to pronounce a limited definition of these claim terms or otherwise redefine these claim terms under this Court's case law. "It is not enough for a patentee to simply disclose a single embodiment or use a word in the same manner in all embodiments, the patentee must 'clearly express an intent' to redefine the term." *Thorner*, 669 F.3d at 1365 (citations omitted). "The standard for disavowal of claim scope is similarly exacting." *Id.* at 1366. "It is … not enough that the only embodiments, or all of the embodiments, contain a particular limitation." *Id*. at 1366-67. Thus, the District Court erred as a matter of law in concluding that DatCard limited the claimed "data" to data "stored in a standard medical imaging format" by disclosing only this type of data in the specification.

Similarly, the District Court erred to the extent it believed that an express disclosure of radiological reports was required in order for the term "related data" to encompass these reports. This Court has never required the express disclosure of every species falling within the scope of broad claim language in order for the claim to cover those species. To the contrary, this Court has "repeatedly warned" that a claim term is not limited to the specific examples disclosed in the specification. *Phillips*, 415 F.3d at 1323. *See also Kara Tech., Inc. v. Stamps.com, Inc.*, 582 F.3d 1341, 1347-48 (Fed. Cir. 2009) (claims are not limited to "the only detailed embodiments in the patent"); *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 905-06 (Fed. Cir. 2004) "It is the claims that define the metes and bounds of the patentee's invention. The patentee is free to choose a broad term and expect to obtain the full scope of its plain and ordinary meaning unless the patentee explicitly redefines the term or disavows its full scope." *Thorner*, 669 F.3d at 1367 (citation omitted).

Moreover, the District Court was simply incorrect in its conclusion that the only type of "data" disclosed in the specification is data stored in a standard medical imaging format. The very first embodiment mentioned in the specification contains a broad disclosure of a search for related "medical exam data," without any suggestion that this type of data must be an image or

otherwise stored in a standard medical imaging format. As stated in the specification: "One embodiment of the claimed system allows for searching [for] medical exam data that are ***related*** and placing such data on the same CD." A191 at 2:14-17 (emphasis added). Thus, the specification discloses that "related" data may be any "medical exam data," not just an image or other data that is stored in a standard medical imaging format.

The specification does, of course, disclose a search for data that is stored in the standard medical imaging format. But that is expressly disclosed as merely another embodiment of the invention. As stated in the specification: "***Yet another embodiment*** of the claimed system is configured to retrieve medical ***image*** data that are ***related*** to the received medical image data, and transmit the retrieved ***related image data*** to the production station." A191 at 2:43-46 (emphasis added). Thus, in this particular embodiment, the "related" data constitutes images which, the specification explains elsewhere, are stored in a standard medical imaging format. *See* A191 at 1:52-63. This, however, in no way undercuts the specification's broad disclosure that the invention may search for and retrieve any "medical exam data."

In short, the District Court erred at least twice in its analysis of the specification. It erred first in reading a preferred embodiment from the

specification into the claims when the specification contains no definition or disavowal so limiting the claims. And it erred again in overlooking an express embodiment of the claimed invention that is broader than the Court's claim construction.

c. The Prosecution History

The District Court did not rely upon prosecution history to construe the claims of the '174 or '597 Patents. However, the prosecution history of these two patents and their parent, the '164 Patent, is highly relevant in this case. As mentioned above, the claims of the parent '164 Patent expressly include a limitation requiring that the data located by the search module be "recorded in the standard medical imaging format." A118 at 10:60-61, A135 at 1:43-44. However, DatCard omitted this limitation from the claims of the '174 and '597 continuation patents.

This prosecution history confirms what should be obvious from a review of the claims of the '174 and '597 Patents. The claims of these patents simply are not limited to data "recorded in the standard medical imaging format." That is a limitation from the parent patent that was omitted from the patents on appeal. It is plainly improper as a matter of law to read a limitation from a claim in a parent patent into a claim in a continuation patent. *See Arlington Industries*,

632 F.3d at 1254 (refusing to read a limitation from a claim of the parent patent into a claim of the patent in suit); *Liebel-Flarsheim*, 358 F.3d at 909 (refusing to read into a claim a limitation that was deleted during prosecution). *See also TurboCare Div. of Demag Delaval v. General Electric*, 264 F.3d 1111, 1123 (Fed. Cir. 2001) (it is improper to read a limitation from one claim into another); *SRI Int'l v. Matsushita Elec. Corp.*, 775 F.2d 1107, 1122 (Fed. Cir. 1985) (en banc) (same). But that is precisely what the District Court did here. This was reversible error.

2. The MediaWriter Searches For "Related Data" And "Additional Medical Data" Under The Correct Construction Of These Terms, And Even Under The District Court's Erroneous Construction Of Them

Under the correct claim construction, it is undisputed that the MediaWriter searches for "related data" and "additional medical data." The MediaWriter searches for radiologists' reports that describe the radiologists' findings regarding the selected patient images. A10, A2048. The reports are plainly "related" to the selected patient images, and are plainly "additional medical data" above and beyond the selected patient images. Accordingly, the MediaWriter satisfies the "related data" and "additional medical data" limitations.

In addition, even under the District Court's erroneous claim construction, the MediaWriter satisfies the disputed claim limitations. The radiologists' reports retrieved by the MediaWriter are indeed in a "standard medical imaging format" in many cases. Specifically, the MediaWriter often retrieves radiologists' reports from a storage device known as a "Mitra broker." A5595 at lines 21-23. These reports are communicated from the Mitra broker to the MediaWriter in the DICOM standard medical imaging format. A5534, A5542. *See also* A5638:16 – A5639:12, A5640:2 – A5641:5. Thus, even if the District Court's restrictive claim construction were correct, the evidence still shows that the MediaWriter searches for "related data" and "additional medical data."

3. Pacsgear Did Not Even Meet Its Initial Burden On The Doctrine Of Equivalents, And The District Court Erred In Granting Summary Judgment Of No Equivalence

Pacsgear's motion for summary judgment gave short shrift to the doctrine of equivalents. Pacsgear merely recited the function/way/result test for infringement under the doctrine of equivalents and declared that this test had not been satisfied. A2065:4-7, A2067:8-13. Pacsgear presented no evidence or analysis at all.

As DatCard explained to the District Court, A3497, Pacsgear's bald assertion was insufficient to carry its initial burden on summary judgment, and

thus insufficient to shift the burden to DatCard to come forward with evidence of equivalence. *Nissan Fire & Marine Ins. v. Fritz Cos.*, 210 F.3d 1099, 1105 (9th Cir. 2000). As the Ninth Circuit[5] explained in *Nissan*: "A moving party may not require the nonmoving party to produce evidence supporting its claim or defense simply by saying that the nonmoving party has no such evidence." *Id.* Instead, the movant must "show that the nonmoving party does not have enough evidence of an essential element of its claim or defense to carry its ultimate burden of persuasion at trial." *Id.* "[I]t is never enough simply to state that the non-moving party cannot meet its burden at trial." *Id.* (quoting *Clark v. Coats & Clark, Inc.*, 929 F.2d 604, 608 (11th Cir. 1991)). Here, Pacsgear did not meet its initial burden and thus did not place the doctrine of equivalents at issue on its motion.

The District Court's discussion of the doctrine of equivalents was as perfunctory as that of Pacsgear. The District Court's entire discussion was as follows:

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[5] Regional circuit law governs procedural issues, such as the burden that must be satisfied by a party seeking summary judgment. *See Glaverbel Societe Anonyme v. Northlake Mktg. & Supply*, 45 F.3d 1550, 1560 n.3 (Fed. Cir. 1995). *See also Anchor Wall Sys. v. Rockwood Retaining Walls*, 340 F.3d 1298, 1306 (Fed. Cir. 2003) (regional circuit law governs the interpretation of the Federal Rules of Civil Procedure).

> On the facts presented, no reasonable jury could deem textual data as equivalent to data formatted in a standard medical imaging format.

A84. The Court cited no evidence whatsoever supporting this conclusion. It is pure *ipse dixit*. In any event, because the doctrine of equivalents was not even placed at issue by Pacsgear's motion, the District Court's grant of summary judgment of non-infringement of the '174 and '597 Patents under the doctrine of equivalents should be reversed.

B. The District Court's Construction Of "Automatically" In The '174 And '597 Patents Is Also Clearly Erroneous

1. This Court Has Jurisdiction To Review The District Court's Construction Of "Automatically"

The District Court did not base its grant of summary judgment to Pacsgear upon its construction of "automatically." However, the construction of "automatically" is properly before this Court for two independent reasons. First, this Court has jurisdiction to review a non-dispositive claim construction ruling that may be relevant on remand. *Decisioning.com, Inc. v. Federated Dep't Stores, Inc.*, 527 F.3d 1300, 1307 (Fed. Cir. 2008); *Chimie v. PPG Indus.*, 402 F.3d 1371, 1375 n.2 (Fed. Cir. 2005). Here, the term "automatically" appears once in the claims of the '174 Patent and repeatedly in the claims of the '597

Patent. Moreover, the District Court has already indicated that it believes the MediaWriter does not satisfy the "automatically" limitation of the '174 Patent. A64. Accordingly, the issue is almost certain to arise again on remand.

Second, DatCard filed a cross-motion for summary judgment of infringement of the '174 Patent, and the District Court denied that cross-motion based upon its construction of "automatically." *Id.* When a District Court grants a motion for summary judgment and denies a related cross-motion for summary judgment, both the grant of the summary judgment motion and the denial of the cross-motion are properly before the Court of Appeals. *Levy v. Sterling Holding Co.*, 544 F.3d 493, 501 n.6 (3d Cir. 2008); *Monahan v. County of Chesterfield*, 95 F.3d 1263, 1265 (4th Cir. 1996); *Barr v. Lafon*, 538 F.3d 554, 562 (6th Cir. 2008); *Stilwell v. Am. Gen. Life Ins.*, 555 F.3d 572, 576 (7th Cir. 2009); *Padfield v. AIG Life Ins..*, 290 F.3d 1121, 1124 (9th Cir. 2002); *Yaffe Cos. v. Great Am. Ins.*, 499 F.3d 1182, 1184 (11th Cir. 2007); *Moore's Federal Practice* § 56.130[3][b] (3d ed. 2013).[6] Accordingly, this Court has jurisdiction to review the denial of DatCard's cross-motion, including the underlying construction of "automatically" on which that denial was based.

[6] This Court has not squarely addressed the issue, but has followed this practice without discussion. *See Dealertrack, Inc. v. Huber*, 674 F.3d 1315, 1320 (Fed. Cir. 2012).

This Court reviews the denial of summary judgment under the standard of review set by regional circuit law. *Dealertrack*, 674 F.3d at 1320. The Ninth Circuit reviews the denial of summary judgment *de novo.* *Id.* (citing *Burke v. County of Alameda*, 586 F.3d 725, 730-31 (9th Cir. 2009)).

2. The District Court Misconstrued "Automatically"

The word "automatically" appears in one limitation of Claim 1 of the '174 Patent, and in most limitations of Claim 1 of the '597 Patent. A195 at 9:35-36, A167 at 9:29-41. Most relevant here is the single "automatically" limitation of the '174 Patent: "a search module configured to ***automatically*** search the database for related data based on the user selection." A195 at 9:35-36. The District Court construed "automatically" to mean "performing the claim steps beginning with 'automatically' ***without*** first asking for user selection or direction for ***each*** step." A25 (emphasis in original). In denying DatCard's cross-motion for summary judgment on the '174 Patent, the Court clarified that this construction excludes systems in which a user or installer must check a box during the initial set up of the device to enable the device to search for related data. A64. According to the District Court, such a device does not "automatically search the database for related data." *Id.* The District Court's construction is clearly erroneous.

a. The District Court Ignored The Ordinary Meaning Of "Automatically"

The District Court again began and ended its analysis with the specification of the patents, skipping entirely any determination of the ordinary meaning of "automatically." A23-A25. As a result, the District Court adopted a construction of "automatically" that is inconsistent with the ordinary meaning of the term and inconsistent with this Court's precedent determining the ordinary meaning of "automatically" in a similar context.

In *CollegeNet*, 418 F.3d at 1235, this Court addressed the ordinary meaning of the word "automatically" in the context of a computer-implemented invention. In *CollegeNet*, the disputed claim was directed to "[a] method of creating and processing over a computer network forms representing applications to different higher education institutions …." *Id*. at 1227. The claim required entry of data for an application for a first educational institution into a database. *Id*. at 1228. The claimed method then created an application for a second educational institution by "***automatically*** inserting into some of the second form data fields applicant information from the database." *Id*.

The defendant argued that "automatically" required a "process that occurs ***without human intervention***, such that a human does not have the option to intercede and alter the flow of that process." *Id*. at 1235 (emphasis in original).

This is very similar to the construction adopted by the District Court in the present case, requiring that each step be conducted without the computer requesting user selection or direction.

This Court in *CollegeNet* rejected the defendant's proposed construction and held that "automatically" meant "***once initiated***, the function is performed by a machine, without the need for manually performing the function," *id*. (emphasis added), precisely the construction advocated by DatCard. In support, this Court explained that many automatic processes have some amount of user intervention:

> [A] machine still performs the claimed functions without manual operation, even though a human may initiate or interrupt the process. . . . Simply because a human has to load an automatic dishwasher and press the start button, and has the ability to turn it off mid-cycle, does not mean that the device does not "automatically" wash the dishes. Similarly, an "autopilot" which is turned on by a human and necessarily must be able to be interrupted by a human once the automatic process is engaged remains an "automatic" device.

Id. (internal quotation marks, citations, and alterations removed for clarity). In short, the *CollegeNet* defendant's proposed construction was more restrictive than the ordinary meaning of "automatically."

The same is true here. The District Court adopted a construction of "automatically" that is far more restrictive than the ordinary meaning. The District Court's construction precludes any request by the system for any input or direction from the user. It even precludes a user or installer from checking a box during the initial installation of the device. As the examples given in *CollegeNet* demonstrate, the word "automatically" is not that restrictive. In contrast, DatCard's proposed construction – the construction adopted by this Court in *CollegeNet* – recognizes that many "automatic" devices and methods require user initiation and user input at various stages.

b. The District Court Ignored The Significance Of The Word "Comprising" In The Claims

Claim 1 of the '174 Patent and Claim 1 of the '597 Patent each include the transitional term "comprising." "The transitional term 'comprising'… is inclusive or open-ended and does not exclude additional, unrecited elements or method steps." *CollegeNet*, 418 F.3d at 1235. This, too, requires that the term "automatically" be construed to allow for human initiation or intervention in the claimed system or method. As explained in *CollegeNet*, while such a claim

"does not expressly provide for human intervention, the use of 'comprising' suggests that additional, unrecited elements are not excluded. Such elements could include human action to expressly initiate the automatic storing or inserting, or to interrupt such functions." *Id.*

This analysis applies directly here. For example, Claim 1 of the '597 Patent is directed to:

> A computer implemented method … ***comprising***:
>
> ***
>
> ***automatically*** searching a first computer database via a first database interface for a first set of medical imaging data …
>
> ***
>
> ***automatically*** searching … a second computer database via a second database interface for additional medical data ….

A167 at 9:24-36 (emphases added). The use of the word "comprising" suggests that additional steps may occur between the first automatic search and the second automatic search. For example, the user may be asked if he or she wishes to proceed with the second automatic search. If the user answers "yes," the system then automatically searches a database for additional medical data, just as an automatic dishwashing machine automatically washes dishes after the user loads the dishes and turns on the machine.

Similarly, Claim 1 of the '174 Patent is directed to:

> A system ***comprising***:
>
> ***
>
> a search module configured to ***automatically*** search the database for related data based on the user selection ….

A195 at 9:25-36 (emphases added). The use of the word "comprising" again suggests that additional software modules may be included, in addition to the search module that automatically searches the database. For example, a software module may be included that solicits the user to confirm that he or she would like the system to conduct the automatic search for related data.

The District Court simply ignored the impact of the word "comprising" and effectively read this critical transitional term out of the claims.

c. <u>The Specification</u>

The specification contains no definition of the term "automatically," nor any disavowal of the full scope of that term. Accordingly, the ordinary meaning should control. *Aventis*, 675 F.3d at 1330; *Thorner*, 669 F.3d at 1365.

The District Court nevertheless found that the specification compelled its narrow definition of "automatically." The District Court identified two disclosed embodiments, one in which the system asks the user if he or she would like to search for related data, and one in which the system conducts the search

without asking for user direction. A24. In describing the latter embodiment, the specification states that "once the user has selected a patient/exam combination, the application server 110 ***automatically*** searches for related data ***without asking for user direction***. A194 at 8:36-39 (emphasis added).

The District Court read this disclosure as defining "automatically" to mean "without asking for user direction." A24-A25. The District Court thereby misread the disclosure and disregarded this Court's case law. A plain reading of the quoted sentence in no way suggests that the inventors were ***defining*** the word "automatically" to mean "without asking for user direction." Instead, the quoted sentence merely explains that the search is conducted ***both*** "automatically" ***and*** "without asking for user direction." That is, the search is "performed by a machine, without the need for manually performing the function," *CollegeNet*, 418 F.3d at 1235, and, in addition, the system does not ask the user whether the search should be performed.

The District Court's reading of the quoted sentence as a definition is strained at best. Moreover, even if the quoted sentence were ambiguous and subject to the Court's interpretation, that would not be enough to re-define the claim term "automatically." As this Court explained emphatically in *Thorner*: "To act as its own lexicographer, a patentee must '***clearly*** set forth a definition

of the disputed claim term' other than its plain and ordinary meaning. … [T]he patentee must '***clearly*** express an intent' to redefine the term." *Thorner*, 669 F.3d at 1365 (emphases added). Perceived ambiguity in the specification is not enough to warrant a redefinition of a claim term. Accordingly, the District Court erred in concluding that the specification redefined "automatically" as "without first asking for user selection or direction." A25.

3. The District Court Erred In Denying DatCard's Cross-Motion For Summary Judgment Of Infringement Of The '174 Patent

The District Court's denial of DatCard's cross-motion was based entirely upon its conclusion that the MediaWriter did not meet the "related data" and "automatically" limitations of Claim 1 of the '174 Patent. A63-A64. As discussed above, it is undisputed that the MediaWriter searches for radiologists' reports. Thus, it searches for "related data" within the meaning of Claim 1. In addition, as DatCard will now explain, the undisputed evidence shows that the MediaWriter "automatically" searches for the related data. In fact, the MediaWriter does this in two separate modes of operation.

First, during the initial installation of a MediaWriter, the user or the installer may check a box entitled "Enable Reports." A1521. Also during the initial installation, the user may check a second box entitled "Include Reports By Default." *Id*. Thereafter, the MediaWriter always searches for radiologists'

reports and burns those reports to a disc whenever the user initiates a search for patient images. *Id.* The user is not asked whether he or she would like to include radiologists' reports on the disc.

This plainly infringes under the correct claim construction. The search for related data "is performed by a machine, without the need for manually performing the function." *CollegeNet*, 418 F.3d at 1235. In fact, in this mode of operation, the MediaWriter infringes even under the District Court's narrow claim construction. The MediaWriter searches for radiologists' reports "without first asking for user selection or direction." A25. Indeed, Pacsgear concedes that this search occurs "automatically" in its user's manual. The user's manual states that the "Include Reports By Default" box may be checked "to ***automatically*** include reports in burn jobs unless the user removes them." A1521 (emphasis added).

Second, the MediaWriter also infringes in a second mode of operation. In this mode, the user or installer still checks the "Enable Reports" box during the initial installation. A1521. However, the user does ***not*** check the "Include Reports By Default" box during installation. This allows the user to choose to burn radiologists' reports to a disc on a job-by-job basis. To do this, the user simply selects a patient image. A dialog box will then appear with a check box

entitled "Include Reports." A1509. The user simply checks this box, and radiologists' reports will be included with the patient's images on the disc. A1510 ("Include Reports" paragraph), A2048-A2049.

Under the correct claim construction, this too constitutes an infringing "search module configured to ***automatically*** search the database for related data based on the user selection." A195 at 9:35-36 (emphasis added). The search "is performed by a machine, without the need for manually performing the function." *CollegeNet*, 418 F.3d at 1235. The MediaWriter does ask the user to confirm that he or she would like the reports included on the disc; but, as in *CollegeNet*, this does not undermine the automatic nature of the search.

Accordingly, the District Court's denial of DatCard's motion for summary judgment of infringement of Claim 1 of the '174 Patent should be reversed. At the very least, the District Court's erroneous construction of "automatically" should be reversed.

VI. CONCLUSION

The District Court misconstrued the claim terms "related data" and "additional medical data." Contrary to the District Court's conclusion, these simple words do not in any way require that the "data" be images or otherwise be maintained in a standard medical imaging format. And nothing in the

specification or prosecution history suggests that these words should be given a special, narrow meaning. Accordingly, the District Court's grant of summary judgment of non-infringement of the '174 and '597 Patents should be reversed.

In addition, the District Court misconstrued the claim term "automatically." Contrary to the District Court's conclusion, this word does not exclude devices or methods in which a user must check a box to initiate a process. Accordingly, the District Court's construction of "automatically," and its corresponding denial of DatCard's cross-motion for summary judgment of infringement of the Claim 1 of the '174 Patent, should be reversed.

Respectfully submitted,

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Dated: July 24, 2013

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CERTIFICATE OF COMPLIANCE

1. This brief complies with the type-volume limitation of Federal Rule of Appellate Procedure 32(a)(7)(B)(i). This brief contains 10,352 words, excluding the parts of the brief exempted by Federal Rule of Appellate Procedure 32(a)(7)(B)(iii).

2. This brief complies with the typeface requirements of Federal Rule of Appellate Procedure 32(a)(5) and the type style requirements of Federal Rule of Appellate Procedure 32(a)(6). This Brief has been prepared in a proportionally spaced typeface using Microsoft Word 2010 in 14 point Times New Roman font.

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ADDENDUM

TABLE TO ADDENDUM

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PACSGEAR, INC.

IN THE UNITED STATES DISTRICT COURT

FOR THE CENTRAL DISTRICT OF CALIFORNIA

SOUTHERN DIVISION

DATCARD SYSTEMS, INC., a California corporation,

Plaintiff,

v.

PACSGEAR, INC., a California corporation,

Defendant.

AND RELATED COUNTERCLAIM

Civil Action No.
SACV10-1288 MRP(VBKx)

FINAL JUDGMENT UNDER RULE 54(b) OF THE FEDERAL RULES OF CIVIL PROCEDURE

The Honorable Mariana R. Pfaelzer

Plaintiff DatCard Systems, Inc. brought the present action against Defendant Pacsgear, Inc. alleging infringement of five patents: U.S. Patent Nos. 7,302,164 ("the '164 Patent"), 7,729,597 ("the '597 Patent"), 7,783,174 ("the '174 Patent"), 7,734,157 ("the '157 Patent"), and 7,801,422 ("the '422 Patent"). Pacsgear filed counterclaims seeking a declaration that each of the patents is not infringed, is invalid, and is unenforceable due to inequitable conduct.

On March 12, 2013, this Court granted Pacsgear summary judgment of invalidity of the '422 Patent. On April 1, 2013, this Court granted Pacsgear summary judgment of non-infringement of the '164 Patent, the '597 Patent, and the '174 Patent. Also on April 1, 2013, this Court granted Pacsgear summary judgment of invalidity of the '157 Patent. Through these rulings, the Court has determined that Pacsgear has no liability under any of the five patents in suit.

The only remaining undecided claims are (1) Pacsgear's counterclaim for a declaration of invalidity of the '164 Patent, '597 Patent, and '174 Patent, and (2) Pacsgear's counterclaim for a declaration of unenforceability of all five patents in suit due to inequitable conduct.

DatCard has informed the Court that it plans to appeal at least some of this Court's summary judgment rulings. Pursuant to Rule 54(b) of the Federal Rules of Civil Procedure, the Court expressly finds that there is no just reason for delay of DatCard's appeal of the summary judgment rulings.

Accordingly, **FINAL JUDGMENT IS HEREBY ENTERED UNDER FED. R. CIV. P. 54(b) AS FOLLOWS**:

1. Judgment is entered in favor of Pacsgear on DatCard's claim of infringement of the '164 Patent, based upon this Court's finding on summary judgment that Pacsgear has not infringed the '164 Patent;

2. Judgment is entered in favor of Pacsgear on DatCard's claim of infringement of the '597 Patent, based upon this Court's finding on summary judgment that Pacsgear has not infringed the '597 Patent;

3. Judgment is entered in favor of Pacsgear on DatCard's claim of infringement of the '174 Patent, based upon this Court's finding on summary judgment that Pacsgear has not infringed the '174 Patent;

4. Judgment is entered in favor of Pacsgear on DatCard's claim of infringement of the '157 Patent, based upon this Court's finding on summary judgment that the asserted claims of the '157 Patent are invalid under 35 U.S.C. § 103;

5. Judgment is entered in favor of Pacsgear on DatCard's claim of infringement of the '422 Patent, based upon this Court's finding on summary judgment that the asserted claims of the '422 Patent are invalid under 35 U.S.C. § 103;

6. Judgment is entered in favor of Pacsgear on Pacsgear's counterclaim for a declaration of non-infringement of the '164 Patent, based upon this Court's finding on summary judgment that Pacsgear has not infringed the '164 Patent;

7. Judgment is entered in favor of Pacsgear on Pacsgear's counterclaim for a declaration of non-infringement of the '597 Patent, based upon this Court's finding on summary judgment that Pacsgear has not infringed the '597 Patent;

8. Judgment is entered in favor of Pacsgear on Pacsgear's counterclaim for a declaration of non-infringement of the '174 Patent, based upon this Court's finding on summary judgment that Pacsgear has not infringed the '174 Patent;

9. Judgment is entered in favor of Pacsgear on Pacsgear's counterclaim for a declaration of invalidity of the '157 Patent, based upon this Court's finding on summary judgment that the asserted claims of the '157 Patent are invalid under 35 U.S.C. § 103; and

/ / /

10. Judgment is entered in favor of Pacsgear on Pacsgear's counterclaim for a declaration of invalidity of the '422 Patent, based upon this Court's finding on summary judgment that the asserted claims of the '422 Patent are invalid under 35 U.S.C. § 103.

11. As discussed above, there are two remaining undecided claims: (1) PacsGear's counterclaim for a declaration of invalidity of the '164 Patent, '597 Patent, and '174 Patent, and (2) Pacsgear's counterclaim for a declaration of unenforceability of all five patents in suit due to inequitable conduct.

12. DatCard has stated that it plans to appeal some of this Court's summary judgment rulings. The parties agree to stay the proceedings on the above remaining counterclaims until after DatCard's appeal of the summary judgment ruling is decided. The Court concurs and hereby stays the proceedings on the two remaining claims identified above, pending appeal. Any motions for attorneys' fees are also stayed and need not be filed, pending appeal.

13. PacsGear, as prevailing party, is entitled to recover its costs, pursuant to Rule 54(d), in an amount to be determined.

Mariana R. Pfaelzer

DATED: June 6, 2013

Hon. Mariana R. Pfaelzer
United States District Judge

15464482

UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA
WESTERN DIVISION

DATCARD SYSTEMS, INC., a California corporation

Plaintiff,

v.

PACSGEAR, INC., a California corporation

Defendant.

Case No. 8:10-cv-01288-MRP-VBK
Claim Construction Order

I. Introduction

Datcard Systems, Inc. ("Datcard") has sued Pacsgear, Inc. ("Pacsgear") for patent infringement.[1] ECF No. 1. Datcard's patented inventions facilitate the handling and delivery of medical image data. The asserted patents fall into three

[1] The asserted patents are U.S. Patent No. 7,302,164 (filed Jan. 17, 2001), entitled "System and Method for Producing Medical Image Data onto Portable Digital Recording Media"; U.S. Patent No. 7,729,597 (filed Jun. 24, 2009) (continuation of the '164 patent); U.S. Patent No. 7,783,174 (filed Jun. 12, 2009) (continuation of the '164 patent); U.S. Patent No. 7,734,157 (filed Jun. 24, 2009) (continuation of the '164 patent); and U.S. Patent No. 7,801,422 (filed Jun. 5, 2009) (continuation of the '164 patent).

groups: (1) Search and Burn; (2) HIPAA; and (3) Timeout. The Search and Burn group includes three patents. These patents claim various ways of managing the flow of medical image data from cradle to grave, i.e., from the image-generation device, to intermediate database servers, and ultimately to the end-user in the form of a labeled CD. The HIPAA patent automates the process of regulatory compliance relating to the privacy of medical records. The Timeout patent claims a way to avoid the premature burning of data onto CDs.

The parties dispute the meaning of certain claim terms in the patents. In this Markman order, the Court construes those terms.

II. Principles of Claim Construction

The purpose of claim construction is to determine the meaning and scope of the patent claims asserted to be infringed. *O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co., Ltd.*, 521 F.3d 1351, 1360 (Fed. Cir. 2008). Claim construction is a pure question of law. *Markman v. Westview Instruments, Inc.*, 517 U.S. 370 (1996). For purposes of claim construction, the Court reviews both intrinsic and extrinsic evidence, placing emphasis on the former.

A. Intrinsic Evidence.

i. Claim Language

"The words of a claim 'are generally given their ordinary and customary meaning.'" *Phillips v. AWH Corp.*¸ 415 F.3d 1303, 1312 (Fed. Cir. 2005) (citation

omitted). "[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Id.* at 1313. "The inquiry into how a person of ordinary skill in the art understands a claim term provides an objective baseline from which to begin claim interpretation." *Id.* "That starting point is based on the well-settled understanding that inventors are typically persons skilled in the field of the invention and that patents are addressed to and intended to be read by others of skill in the pertinent art." *Id.*

ii. Specification

The specification is "always highly relevant to the claim construction analysis." *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 978 (Fed. Cir. 1995). As Judge Rich wrote shortly after the creation of the Federal Circuit, "the specification . . . is the primary basis for construing the claims." *Standard Oil Co. v. Am. Cyanamid Co.*, 774 F.2d 448, 452 (Fed. Cir. 1985). "[T]he specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs." *Phillips*, 415 F.3d at 1316. "In other cases, the specification may reveal an intentional disclaimer, or disavowal, of claim scope by the inventor." *Id.* In such

cases, the inventor's intention as expressed in the specification "is regarded as dispositive." *Id.*

iii. Prosecution History

The Court also considers the patent's prosecution history, if it is in evidence. "The prosecution history, which we have designated as part of the "intrinsic evidence," consists of the complete record of the proceedings before the PTO and includes the prior art cited during the examination of the patent." *Id.* The patentee created the prosecution history much like the specification in an attempt to explain and obtain the patent, and thus the prosecution history provides evidence about how the PTO and the inventor understood the patent. *Id.* "Yet because the prosecution history represents an ongoing negotiation between the PTO and the applicant, rather than the final product of that negotiation, it often lacks the clarity of the specification and thus is less useful for claim construction purposes." *Id.* "Nonetheless, the prosecution history can often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be." *Id.*

B. Extrinsic Evidence

In addition to using intrinsic evidence, this Court is also authorized to use extrinsic evidence in claim construction. *Phillips*, 415 F.3d at 1317 ("[W]e have . .

. authorized district courts to rely on extrinsic evidence . . . ."). Extrinsic evidence "consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises." *Id*. While extrinsic evidence can shed light on claim meaning, it is "less significant than the intrinsic record in determining 'the legally operative meaning of claim language.'" *Id*. (citation omitted). Finally, extrinsic evidence is "unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence." *Id.* at 1319.

III. CLAIM CONSTRUCTION

A. Search Burn Patents

The three Search Burn patents are directed to systems and methods for facilitating the search and delivery of a patient's medical images.[2] The parties dispute the meaning of certain claim terms. Some disputes are over identical terms in all three patents. Other disputes are over similar terms across the patents. The Court has grouped these disputes because the analyses are similar. The grouped disputes (with corresponding patent numbers) are:

i. "related medical image data" ('164), "additional medical data . . . related to the patient" ('597), and "related data" ('174);

ii. "database" ('164, '174);

[2] The three Search Burn patents are: (1) U.S. Patent No. 7,302,164 (filed Jan. 17, 2001) ("the '164 patent"), entitled "System and Method for Producing Medical Image Data onto Portable Digital Recording Media"; (2) U.S. Patent No. 7,729,597 (filed Jun. 24, 2009) ("the '597 patent") (continuation of the '164 patent); and (3) U.S. Patent No. 7,783,174 (filed Jun. 12, 2009) ("the '174 patent") (continuation of the '164 patent).

iii. "automatically" ('597, '174); and

iv. whether the claim elements "printing" and "affixing" the label must occur sequentially ('164).

The Court next considers each dispute in turn:

i. "related medical image data" ('164 patent), "additional medical data . . . related to the patient" ('597 patent), "related data" ('174 patent)

The relevant claim limitations for these disputed claim terms are:

(a) "a search module configured to search the database for ***related medical image data*** that is related to the selected medical image data . . . ." '164 patent at col. 10 II. 53-55 (emphasis added);

(b) "automatically searching, based on the received request, a second computer database via a second database interface for ***additional medical data*** also ***related*** to the patient . . . ." '597 patent at col. 9 II. 34-36 (emphasis added); and

(c) "a search module configured to automatically search the database for ***related data*** based on the user selection . . . ." '174 patent at col. 9 II. 24-47 (emphasis added).

The accused infringing product, MediaWriter version 3.0, allows the user to burn a radiologist's text reports onto a CD along with selected images.[3] Not surprisingly, the parties dispute whether the claim terms above cover non-image data like text reports.

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[3] Pacsgear's Motion for Summary Judgment of Non-Infringement of the Search/Burn Patents [hereinafter "Mot."] at 3 (ECF No. 67). Datcard's opposition to the above motion is hereinafter referred to as "Opp." ECF No. 87.

(a) "related medical image data" '164 patent

The Court finds that "related medical image data" means data which is (1) in a standard medical imaging format, and (2) is related to the selected medical image data.[4] The Court rests this finding on three bases: (1) claim language; (2) the rule of internal consistency; and (3) support in the specification.

1. Claim language

The phrase "related medical image data" contains three nested modifiers. We start with the word "data." "Image" modifies "data" yielding "image data." "Medical" modifies "image data" yielding "medical image data." Finally, "related" modifies "medical image data" yielding "related medical image data." But before construing "related medical image data," it is helpful to analyze the meaning of the sub-phrase "medical image data." "Medical image data" is neither a technical term of art in the relevant field,[5] nor a specially defined term in the specification.

The first limitation of Claim 9 recites: "a medical server configured to receive medical image data that is generated by a plurality of imaging modalities, the ***medical image data being formatted in a standard medical imaging format*** used by specialized computers configured for viewing medical images . . . ." Here, "medical image data" plainly refers to data formatted in a standard medical

[4] Whether or not this covers a radiologist's text report turns on whether the report is stored in a standard medical imaging format.

[5] *See, e.g.*, Dr. Rowberg's testimony, Opp. at 16 ("I almost wonder if it's a legal term instead of a medical term because it's out of my normal vocabulary.").

imaging format. Thus, "related medical image data" simply means medical image data that is related to the selected medical image data. Put another way, "related medical image data" means data that is both: (1) formatted in standard medical imaging format; and (2) related to the selected medical image data.

Datcard argues that "related medical image data" means any kind of data (not just medical image data) that is related to the selected medical image data. Opp. at 21. This is incorrect because it fails to account for the modifying effect of "medical image" upon "data." Pacsgear argues that "related medical image data" only refers to images. Mot. at 9. This too is incorrect because it would exclude non-image data formatted in standard medical imaging format. Some such non-image data include "patient demographics[] and exam information such as patient name, patient age, exam number, exam modality, exam machine name, and exam date." '164 patent at col. 1 II. 48-55 (listing non-image DICOM compatible data types stored in the header preceding the exam images).

2. The rule of internal consistency

Under this rule, "[a] word or phrase used consistently throughout a claim should be interpreted consistently." *Phonometrics, Inc. v. Northern Telecom Inc.*, 133 F.3d 1459, 1465 (Fed. Cir. 1998). Thus, the Court should interpret "related medical image data" consistently throughout Claim 9.

Claim 9 contains other instances of "related medical image data":

> the selected medical image data, recorded in the standard medical imaging format,
>
> the ***related medical image data, recorded in the standard medical imaging format***, and
>
> ***a viewing program that is configured to allow viewing of*** the selected and the ***related medical image data*** that is recorded onto the data storage medium on widely accessible computers not specifically configured with standard medical imaging software for ***viewing of medical images***.
>
> '164 patent at col. 1 II. 40-50 (Claim 9).

"Related medical image data" in the above instances is plainly limited to data recorded in the standard medical imaging format. The rule of internal consistency thus calls for the same construction for "related medical image data" in the claim limitation under consideration.

3. Support in the specification

The specification of the '164 patent provides further support for limiting the scope of "related medical image data" to data formatted in the standard medical imaging format. The specification states:

> To ease the communication of data, the DICOM (Digital Imaging and Communications in Medicine) standard was developed by ACR-NEMA (American College of Radiology-National Electrical Manufacturer's Association) for communication between medical imaging devices and PACS. In addition to the examined images, patient demographics, and exam information such as patient name, patient age, exam number, exam modality, exam machine name, and exam date can also be stored and retrieved in DICOM compatible data format. A DICOM file stores patient and exam information in the header of the file, followed by the exam images. PACS store ***medical image data*** in DICOM format.

'164 patent at col. 1 II. 43-55.

The specification, therefore, supports the Court's construction of "related medical image data" as limited to data formatted in standard medical imaging format.

The Court's approach has: (1) placed primary emphasis on the plain and ordinary meaning of the claim language; (2) abided by the rule of internal consistency; and (3) construed "related medical image data" in light of specification. "Related medical image data" is data: (1) formatted in the standard medical imaging format; (2) related to the selected medical image data. The parties dispute about whether "related medical image data" covers a radiologist's test reports. Under the Court's construction, the answer to that question depends on whether radiologist reports are formatted in the standard medical imaging format. Pacsgear asserts that such reports are not in a standard medical imaging format. Mot. at 3 ("[The radiologist's] reports are in text format . . . ."). Datcard does not appear to take a contrary position. "Related medical image data" does not cover such reports, assuming they are not formatted in a standard medical imaging format.

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(b) "additional [related] medical data," '597 patent; and "related data" '174 patent

The relevant claim terms are:

(1) "automatically searching, based on the received request, a second computer database via a second database interface for ***additional medical data*** also ***related*** to the patient . . . ." '597 patent at col. 9 II. 34-36 (emphasis added); and

(2) "a search module configured to automatically search the database for ***related data*** based on the user selection . . . ." '174 patent at col. 9 II. 24-47 (emphasis added).

Claim terms like "related data" and "additional [related] medical data" have fewer modifiers for "data" than the claim term "related medical image data." This might seem, at first blush, to support a broader construction for the former claim terms than the latter. Not surprisingly, the seemingly broader claim terms appear in continuation patents. "The name of the game is the claim" for parent patents and continuations alike.[6] But the Court must pay close attention to the specification when construing a claim term in a continuation.[7] The fundamental tension between the prohibition against importing limitations from the specification into the claims on the one hand, and construing claims in light of the specification on the other, is of special concern in the continuations context. Even in a regular setting, the

[6] Giles S. Rich, *The Extent of the Protection and Interpretation of Claims – American Perspectives*, 21 INT'L REV. INDUS. PROP. & COPYRIGHT L. 497, 499, 501 (1990).

[7] *See* Mark A. Lemley & Kimberly A. Moore, *Ending Abuse of Patent Continuations*, 84 B.U. L. REV. 63 (2004)

prohibition against importing limitations and the mandate of construing claims in light of the specification presents a fundamental problem of claim construction.

No Federal Circuit opinion captures the essence of this fundamental problem quite as vividly as *Arlington Industries, Inc. v. Bridgeport Fittings, Inc.*, 632 F.3d 1246 (Fed. Cir. 2011). Judge Lourie's opinion in that case, concurring in part and dissenting in part, is particularly revealing. In relevant part, Judge Lourie states, "[T]he basic mandate is for claims to be interpreted in light of the specification of which they are a part because the specification describes what the inventors invented. The specification is the heart of the patent. In colloquial terms, '***you should get what you disclose.***'" *Arlington Indus.*, 632 F.3d at 1257 (Lourie, J., concurring in part and dissenting in part). To that point, the author of the majority opinion, Chief Judge Rader, stated,

> The concurrence-in-part and dissent-in-part characterizes the specification as the "heart of the patent" and, using "colloquial terms," states that "you should get what you disclose." This devalues the importance of claim language in delimiting the scope of legal protection. "Claims define and circumscribe, the written description discloses and teaches." *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1347 (Fed.Cir.2010) (en banc). To use a colloquial term coined by Judge Rich, "***the name of the game is the claim***." Giles S. Rich, *The Extent of the Protection and Interpretation of Claims–American Perspectives*, 21 INT'L REV. INDUS. PROP. & COPYRIGHT L. 497, 499, 501 (1990). Indeed, unclaimed disclosures are dedicated to the public. *Johnson & Johnston Assocs. Inc. v. R.E. Serv. Co.*, 285 F.3d 1046, 1051 (Fed.Cir.2002) (en banc).
>
> *Id.* at 1255, n.2 (emphasis added).

Incidentally, the difference between "the name of the game is the claim" and "you should get what you disclose" is identical to that between the prohibition against importing limitations and construing the claims *in light of* the specification.

Returning to the claim terms at hand, the dispute between the parties is whether "additional [related] medical data" in the '597 patent and "related data" in the '174 patent are limited to DICOM images, to the exclusion of non-image data like text reports. Again, both parties propose incorrect constructions. The terms are neither so broad as to encompass all types of data, nor so narrow as to be limited to images. Instead, as explained below, "related data" and "additional [related] medical data" are limited to data: (1) in a standard medical imaging format; and (2) related to the selected medical image data.

Texas Digital, a case criticized in *Phillips*, had listed two circumstances where the patent's specification and prosecution history must be consulted to determine if the patentee has used claim terms in a manner inconsistent with the ordinary meaning reflected in a dictionary definition: (1) where the patentee, acting as his or her own lexicographer, has clearly set forth an explicit definition of the term different from its ordinary meaning; and (2) if the inventor has disavowed or disclaimed scope of coverage by using words or expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope. 415 F.3d at 1319 (citing *Texas Digital Sys., Inc. v. Telegenix, Inc.*, 308 F.3d 1193 (Fed. Cir. 2002).

But *Phillips* characterized *Texas Digital*'s take on claim construction as placing "too little [reliance] on intrinsic sources, in particular the specification and prosecution history."

Phillips stated, "Assigning such a limited role to the specification . . . is inconsistent with our rulings that the specification is ***the single best guide to the meaning of a disputed term*** . . . ." *Id.* at 1320-21 (citation omitted). *See Irdeto Access, Inc. v. Echostar Satellite Corp.*, 383 F.3d 1295, 1300 (Fed. Cir. 2004) ("Even when guidance is not provided in explicit definitional format, the specification may define claim terms ***by implication*** such that meaning may be found in or ascertained by a reading of the patent documents."); *Bell Atl. Network Servs., Inc. v. Covad Commc's Grp., Inc.*, 262 F.3d 1258, 1268 (Fed. Cir. 2001) ("[A] claim term may be clearly redefined without an explicit statement of redefinition.").

To be sure, *Phillips* acknowledged "that the purpose underlying the *Texas Digital* line of cases – to avoid the danger of reading limitations from the specification into the claim – is sound." *Id.* at 1323. But *Phillips* also acknowledged that "the distinction between using the specification to interpret the meaning of a claim and importing limitations from the specification into the claim can be a difficult one to apply in practice." *Id.* "[T]he line between construing terms and importing limitations can be discerned with reasonable certainty and

predictability ***if the court's focus remains on understanding how a person of ordinary skill in the art would understand the claim terms***." *Id.* (emphasis added). "[T]he person of ordinary skill in the art is deemed to read the claim not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Phillips*, 415 F.3d at 1313. *See also Medrad, Inc. v. MRI Devices Corp.*, 401 F.3d 1313, 1319 (Fed. Cir. 2005) ("We cannot look at the ordinary meaning of the term . . . ***in a vacuum***. Rather, we must look at the ordinary meaning in the context of the written description and the prosecution history.").

Datcard seeks too broad a construction by interpreting "related data" to include "data in general." Opp. at 10. The three patents share a common specification. This specification only describes an invention where "data" in "related data" or "additional [related] medical data" is stored in a standard medical imaging format. It is perfectly legitimate to ask for more real estate, so to speak, by drafting broader claim terms in a continuation application; so long as those newer and broader claims are moored to the specification. Construing "related data" and "additional [related] medical data" as referring to data in a standard medical imaging format is not an exercise in importing a limitation from a preferred embodiment in the specification. Instead, it is a grant of patent protection that ends at what the

patentee disclosed and described in the specification. It is a construction of the claims in light of the entire specification; not a construction of claims in a vacuum.

Pacsgear is also incorrect in limiting "related data" and "additional [related] medical data" to images. The patent specification states, "In addition to the examined images, ***patient demographics[] and exam information*** . . . can also be stored and retrieved in DICOM compatible data format . . . in the header of the file, followed by the exam images." '164 patent col. 1 II. 58-52. These non-image data types, i.e., patient demographics and exam information, are as much part of the standard medical imaging standard as the images themselves. There is no basis for excluding these types of related data or additional related medical data from the claim scope. While Pacsgear attempts to exclude such non-image DICOM data from the claim scope, Datcard attempts to do the opposite, i.e., include non-image ***non-***DICOM data such as the radiologist's text reports within the claim scope. Under the Court's construction, "related data" and "additional [related] medical data" exclude a radiologist's text reports unless they are stored in a standard medical imaging format.

ii. "database" ('164, '174, '597);

Claim 9 of the '164 patent, in relevant part, recites:

> ***a database*** configured to store medical image data generated by the plurality of imaging modalities;

> a plurality of browsing terminals configured to receive a user selection that defines selected medical image data;
>
> a search module configured to search ***the database*** for related medical image data that is related to the selected medical image data

Claim 1 of the '174 patent, in relevant part, recites:

> ***a database*** configured store medical image data generated by the one or more imaging modalities;
>
> a plurality of browsing terminals configured to receive a user selection that defines selected medical image data for a patient;
>
> a search module configured to automatically search ***the database*** for related data based on user selection

The parties dispute about the construction of the claim limitation "database." Pacsgear contends that database means "the electronic collection of image data stored in a way to allow for easy search and retrieval following the request of a user." Mot. at 7. Datcard cites the dictionary for a definition of database as "a structured set of data held in a computer." Opp. at 9.

In the context of the above claims, it is redundant to define database in terms of its contents. The claim language itself performs that task by requiring "a database" to be configured to store medical image data, which the Court previously construed as limited to data in a standard medical imaging format. While the Court agrees with Pacsgear that "*the* database" in the above claims plainly refers back to "a database" earlier in the same claim, it also agrees with Datcard that a database is merely "a structured set of data held in a computer."

Claim 1 of the '597 patent, in relevant part, recites:

> automatically searching a first computer ***database*** via a first database interface for a first set of medical image data related to the patient based on the received request;
>
> automatically retrieving the first set of medical imaging data related to the patient;
>
> automatically searching, based on the received request, a second computer ***database*** via a second database interface for additional medical data also related to the patient, wherein the second interface is different from the first interface

Unlike the '164 and '174 patents, where "the database" referred back to "a database," Claim 1 of the '597 patent defines two separate databases. Here, too, it is redundant to limit "database" by the type of content stored because the claims adequately do that by reciting the steps of searching the first database for medical image data and the second database for additional medical data. The Court has already construed "medical image data" and "additional medical data" to mean data in a standard medical imaging format. Consequently, again, the Court agrees with Datcard that a database is merely "a structured set of data held in a computer."

iii. "automatically" ('597, '174)

Claim 1 of the '597 patent is a multi-step method patent. The claim recites:

> A computer-implemented method for automatically generating a portable computer-readable medium containing medical data related to a patient, comprising:

> receiving, via computer-implemented interface a request for medical data related to the patient;
>
> ***automatically*** searching a first computer database via a first database interface for a first set of medical imaging data related to the patient based on the received request;
>
> ***automatically*** retrieving the first set of medical imaging data related to the patient;
>
> ***automatically*** searching, based on the received request, a second computer database via a second database interface for additional medical data also related to the patient, wherein the second interface is different from the first interface;
>
> ***automatically*** receiving the additional related medical data; and
>
> ***automatically*** generating a portable computer-readable medium, at a production station, containing the first set of medical imaging data related to the patient and the additional related medical data, wherein the first set of medical imaging data is formatted in a standard medical imaging format used by a computer configured for viewing the medical imaging data.
>
> '597 patent col. 9 II. 24-47 (Claim 1)

First, the claim requires receiving a request for medical data. Next, the claim requires automatic performance of a series of tasks (retrieving, searching, receiving, and generating). The parties dispute the meaning of "automatically." According to Datcard, automatically means that "once initiated, the function is performed by a machine, without the need for manually performing the function." Opp. at 11. Given that "automatically" appears in several recited steps, Datcard's definition must be applied to *each* step. Datcard is effectively construing "automatically" as "once ***[each step]*** is initiated, the function is performed by a

machine, without the need for manually performing the function." But that is not a satisfactory interpretation of the claim language because the "receiving" limitation lacks an "automatically" qualifier despite the fact that once a user initiates the receiving step by submitting a request for medical data, the receiving function is performed by a machine, without the need for manually performing the function.

In the specification, the patentee compares and contrasts two disclosed embodiments – one with the "automatically" feature with one without. The embodiment without the "automatically" feature states, "The user is then asked in step 180 if he/she desires to find related data of that patient for comparative study. If the user answers yes, the application server 110 then searches for related data." '164 patent at col. 8 II. 37-41; and "[s]till referring to FIG. 5, the user is then prompted to select all or some of the related data from the list of found related data for production, in step 184." '164 patent at col. 8 II. 54-56. By contrast, the embodiment with the "automatically" feature states, "In another embodiment, once the user has selected a patient/exam combination, the application server 110 automatically searches for related data ***without asking for user direction***," '164 patent at col. 8 II. 46-49, and "In another embodiment, all found related data are automatically selected by the application server 110 for production, ***without prompting for user selection***."

"Automatically," in the context of the claim language and in light of the specification, means performing the claim steps beginning with "automatically" *without* first asking for user selection or direction for *each* step. Mot. at 17.

iv. whether the claim elements "printing" and "affixing" the label must occur sequentially ('164).

Claim 16 recites "printing a label using the production station, wherein the label includes identifying information associated with the selected medical image data; and affixing the label to the data storage medium using the production station." Opp. at 22. "The MediaWriter . . . uses a CD Burner with an ink jet system that quickly and directly places information on the CD." Mot. at 14. Pacsgear construes Claim16 as requiring printing to take place before affixing. *Id.* (arguing non-infringement because Pacsgear's products do not first print, ***then*** affix the label to the CD). But "[u]nless the steps of a method actually recite an order, the steps are not ordinarily construed to require one." *Interactive Gift Express, Inc. v. Compuserve, Inc.*, 256 F.3d 1323, 1342 (Fed. Cir. 2001). While some order is inherent in certain subsets of the claim steps (e.g., receiving data before storing it, searching data before recording it, etc.), Claim 16 does not recite any order of performance for the steps. Instead, the claim recites "printing . . . and affixing." '164 patent at col. 11 II. 47-52.

The Court finds that printing and affixing are not sequential operations.

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B. HIPAA Patent

The HIPAA patent is U.S. Patent No. 7,734,157 (filed Jun. 24, 2009) ("the '157 patent"), entitled "System and Method for Producing Medical Image Data onto Portable Digital Recording Media." The parties dispute the meaning of some claim terms in Claim 7 in the '157 patent:

> A system for generating a portable computer-readable medium containing medical data for a first patient, wherein the medical data for the first patient are audited based on a plurality of audit records stored in an audit database, comprising:
>
> ***a computer-implemented interface configured to receive two or more requests for production of stored medical data related to the first patient***; and
>
> an image production module that is configured, for each request for production of stored medical data related to the first patient;
>
> to produce the portable computer-readable medium containing the requested medical data related to the first patient, wherein the requested medical data comprises medical image data formatted in a standard medical imaging format used by a computer configured for viewing the medical image data; and
>
> upon producing the computer-readable medium, to automatically transmit, to the audit database, audit data that is specific to the computer-readable medium produced in response to the request for stored medical data, wherein the audit data comprises at least ***an identification specific to the computer-readable medium***, an identification of a requester of the stored medical data, and an identification of the first patient, and is for at least one audit record in the plurality of audit records in the audit database.

'157 patent at col. 10 II. 12-38.

The parties dispute the meaning of the bolded claim language. The Court addresses each dispute in turn:

i. "a computer-implemented interface configured to receive two or more requests for production of stored medical data related to the first patient"

Pacsgear contends that this claim term requires a user to make two requests for production relating to the same patient. Pacsgear's opposition to Datcard's motion for summary judgment of infringement for the '174 and '157 patents [hereinafter "Opp."] at 17.[8] Given that Claim 7 is a directed to an apparatus claim and not a method claim, Datcard argues that "[t]he disputed claim limitation says nothing about what a 'user' must do." Reply at 17. According to Datcard, the claim limitation only means that the computer interface must have structural components enabling it to receive two or more requests for production of stored medical data related to the first patient. *Id.* The Court agrees with Datcard. The disputed claim term refers to a system's configuration to receive two or more requests. This system claim does not refer to user action.

ii. "an identification specific to the computer-readable medium"

Pacsgear proposes the following construction: "an identification unique to the *single* compact disc or other storage medium." Opp. at 19. Datcard proposes "an

[8] Datcard's motion is hereinafter referred to as "Mot."

identification, such as a clearly defined or identified number, of the computer-readable medium (plural)." Mot. at 23.

The plain and ordinary meaning of the claim language is written in the singular given that the word "medium" is in a singular form. But this could mean that the singular form attaches to the type of medium (CD, DVD, Bluray, flash drive, each being one medium), or it could mean that the singular form means "one CD." The first line of the patent specification states, "This invention relates to a system and method for the production of medical image data on portable digital recording ***media*** such as compact ***discs***." '157 patent at col. 1 II. 23-25. The patentee has thus used the plural form "media" when discussing multiple compact discs. The first line of the section called "Summary of the Invention" states, "The claimed system allows for digital medical image data to be produced on a portable digital recording ***medium*** such as ***a CD***." *Id.* at col. 2 II. 7-9 (containing further references to the singular form such as "a CD," "the CD," and "the same CD"). The specification further states, "The number of CDs produced corresponds to the 'number of copies' number sent by the application server 110 in step 142." *Id.* at col. 6:66-67, 7:1. But in a section entitled "Detailed Description of the Preferred Embodiment," the specification states, "Digital portable recording ***medium*** comprises ***CDs*** and DVDs . . . any ***suitable portable digital recording medium*** can be substituted for ***CDs.***" *Id.* at col. 3 II. 30-31.

Thus, the patentee has used "medium" when referring to both singular and plural forms of CD at different places in the specification. But in these last statements, the patentee is not referring to the plural form ("CDs") as a solution to the problem that arises when the requested medical data exceeds the storage capacity of a single disc. Instead, the plural form is only invoked to describe the generic medium of compact discs. When referencing the actual operation of the claimed invention, the specification is clear that only one CD is anticipated to store image data. The only instances of the plural form, "CDs," in the context of the operation of the invention are references to the number of copies requested by the user. Again, the specification states, "The number of CDs produced corresponds to the 'number of copies' number sent by the application server 110 in step 142." *Id.* at col. 6:66-67, 7:1.

Datcard argues that "[i]f the requested medical data exceeds the storage capacity of a single disc, a set of discs is a suitable portable digital recording medium." Mot. at 22. That may be so, but the specification is void of any reference to multiple CDs being used to store one image because of size constraints. The patent neither describes a multiple-CD-based solution to the size-constraint problem, nor evidences the patentee's possession of such an invention at the time of filing. As a technical matter, it is just as plausible to have unique identification numbers for multiple discs for the same job (with a numerical suffix, for example,

indicating the disc number for the same job), as it is to have a unique identifier specific to a set of discs. Given the claim language, and in light of the void in the specification for this issue, the appropriate construction for "computer readable medium," therefore, is limited to one compact disc. Accordingly, the claim term "an identification specific to the computer readable medium" refers to a unique identification for each instance of the computer-readable medium (e.g., each CD).

C. Timeout Patent

The Timeout patent is U.S. Patent No. 7,801,422 (filed Jun. 5, 2009) ("the '422 patent"), entitled "System and Method for Producing Medical Image Data onto Portable Digital Recording Media." The parties dispute the meaning of some claim terms in Claims 1 and 8 of the '422 patent. The Court discusses each claim in turn.

i. Claim 1

Claim 1 of the Timeout patent, with the point of contention bolded, states:

> A method of automatically producing medical image data and related data on an optical storage medium upon expiration of a timeout period, the method comprising:
>
> > ***detecting whether a server has changed within a timeout period after receiving medical image data or related data*** from a modality and resetting the timeout period when the change is detected; and
> >
> > automatically producing an optical storage medium comprising selected medical image data and related data from the server based on when the timeout period has expired and recording on the optical storage medium program code that, when executed, allows viewing of the selected medical image data, wherein the medical image data is

> formatted in a standard medical imaging format used by a computer configured for viewing the medical image data.

'422 patent, col. 9 II. 15-32.

Before commencing a comparative study of the parties' diverging contentions regarding the meaning of the bolded claim phrase, the Court introduces two concepts to aid the analysis: (1) the time of detection; and (2) the range of detection. The time of detection refers to the discrete point in time when the system performs the detecting step. The range of detection refers to the time interval for which detection takes place. These are fundamentally different ideas. An analogy helps to define the concepts and draw out the distinction. Consider the year-to-date gain of a stock, where the stock price is checked at the end of the first quarter. Here, the time of detection is April 1. The range of detection for the year-to-date gain is the three-month period between January 1 and March 31.

Returning to the case at bar, the disputed claim phrase is "detecting whether a server has changed within a timeout period after receiving medical image data or related data." Pacsgear's proposed construction conflates the concepts of time and range of detection. DatCard's proposed construction is that whereas the time of detection is *after* the expiry of the timeout interval, the range is *before*. The Court reviews the claim language and specification to determine the appropriate time of detection and range of detection for the detecting step.

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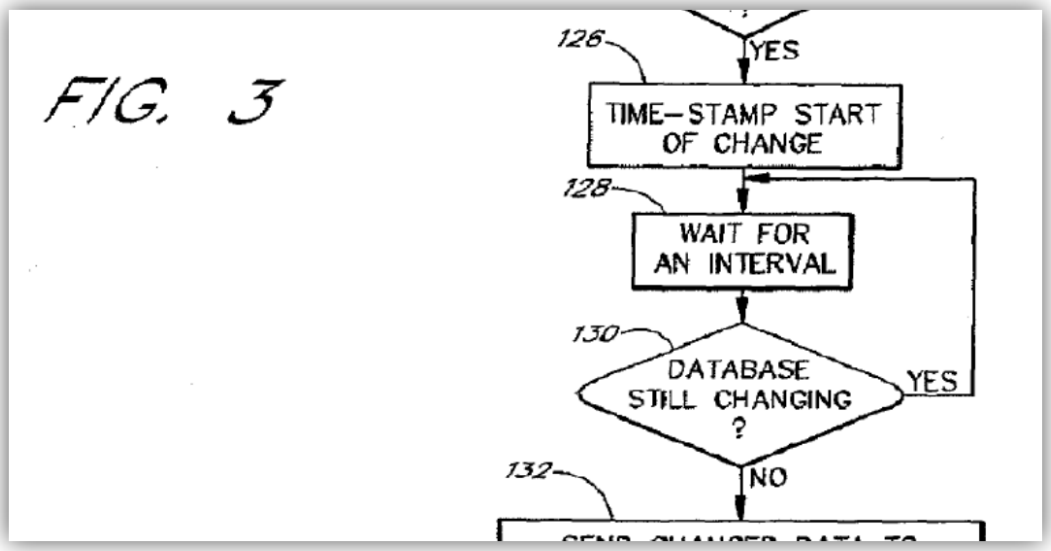
(a) Time of detection

The claim language states "detecting whether a server has changed within a timeout period after receiving medical image data or related data." PacsGear argues that this claim language "requires the detection to take place **before** the time interval expires." Mot. at 2. The only way the claim language "requires" the detection to take place before the time interval expires is if the phrase "detecting whether a server has changed within a timeout period" is rearranged as follows: "detecting, within a timeout period, whether a server has changed." A more likely interpretation is that the phrase "within a timeout period" qualifies "server has changed" and not "detecting." While the claim language does not settle the issue, the specification does.



'442 Patent, Figure 3.

The detecting step 130 in Figure 3 entitled "Database Still Changing?" occurs *after* step 128 entitled "Wait for an Interval." The specification provides further confirmation that the time of detection is *after* the timeout period. "[U]pon observing a change in the image server database 202, '[t]he application server 110 then proceeds to step 128 and waits for an interval, typically 35 to 65 seconds. ***After*** the interval, the application server 110 ***checks*** whether the image server database 202 is still changing, in step 130.'" Mot. at 2 (citing the '422 patent specification, col. 5:28-33) (emphasis).

PacsGear's argument in its motion that "Claim 1 requires the detection to take place **before** the time interval expires" might be logically consistent with the claim language, but wholly excludes the preferred embodiment in the '422 specification. "A claim construction that excludes the preferred embodiment 'is rarely, if ever, correct and would require highly persuasive evidentiary support.'" *Adams Respiratory Therapeutics, Inc. v. Perrigo Co.*, 616 F.3d 1283, 1290 (Fed. Cir. 2010) (quoting *Vitronics Corp. v. Conceptronic Inc.*, 90 F.3d 1576, 1583-84 (Fed. Cir. 1996)). PacsGear has failed to provide the requisite "highly persuasive evidentiary support."

In light of Figure 3 and the cited language in the specification, the Court finds that the time of detection is *after* the expiry of the timeout interval. "There is sometimes a fine line between reading a claim in light of the specification, and

reading a limitation into the claim from the specification." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1323 (Fed. Cir. 2005) (citation omitted). The Court has taken care not to import this limitation from the preferred embodiment into Claim 1, and has only interpreted the claim language *in light of* the specification.

(b) Range of detection

By arguing that "knowing that the size of the database is increasing after the expiration of the waiting interval tells you nothing about whether the database was changing 'before' or 'within' the waiting interval," Pacsgear has effectively argued that the range of detection is *after* the expiry of the timeout interval. Reply at 2-3. The Court rejects this argument because Pacsgear improperly connects the phrase "after the expiration of the waiting interval" to the changes in the "size of the database." Nothing in the patent refers to post-timeout changes in the size of the database.

The present-continuous tense of the phrase "Database Still Changing" in Figure 3 might suggest a detection mechanism for post-timeout changes in the database. But that phrase does not exist in isolation; it appears in a sequential flowchart immediately ***after*** step 128 entitled "Wait for an Interval." The claim language, "detecting whether a server has changed," maps to "Database Still Changing?" Thus, Pacsgear's argument mischaracterizes the patented claim by

improperly isolating a phrase from a sequential flowchart and further improperly focusing on a difference in tense.

The Court finds that the range of detection is *before* the expiry of the timeout interval.

(c) "timeout period"

The parties dispute the meaning of the phrase "timeout period" in Claim 1. PacsGear argues that the "timeout period" refers to "a period that starts over every time an **unpredictable** event occurs." DatCard argues that "timeout period" refers to "a predefined length of time that began at the occurrence of a **specified** event." Opp. at 5. PacsGear's use of the word "period" in its construction is consistent with DatCard's use of the phrase "predefined length of time." Further, the specification states that "[t]he application server 110 then proceeds to step 128 and waits for an interval, typically 35 to 65 seconds." '422 patent at col. 5 II. 29-31. In light of the specification, the Court finds that the timeout period is a predefined length of time. The parties' only remaining dispute is whether the event triggering a restart of the timeout period is unpredictable or specified.

PacsGear's proposed qualification of the event triggering a restart of the timeout period as "unpredictable" contradicts the preferred embodiment which specifies the triggering event as "a change in the image server database." '422 patent at col. 5 II. 26-29 ("If there is a change in the image server database 202,

then the application server 110 proceeds to step 126 and time-stamps the moment that the change started."). The Court does not define the timeout period in terms of the type of event which triggers a resetting of that period. The claim step in question recites "detecting whether a server has changed within a timeout period after receiving medical image data or related data from a modality and resetting the timeout period when the change is detected." Thus, the claim language itself discloses further claim limitations pertaining to the event triggering a resetting of the timeout period, i.e., a change in the server. The event triggering the resetting of the timeout period does not inform the definition of the claim term "timeout period" in and of itself, which simply refers to a predefined period of time.

Thus, the Court construes "timeout period" as a predefined period of time.

ii. Claim 8

Claim 8 of the Timeout patent, with the point of contention bolded, states:

> A system for automatically producing medical images on an optical storage medium, the system comprising:
>
> > a database configured to receive one or more medical images from at least one modality;
> >
> > an application server coupled to the database and configured to create a timestamp ***when the application server detects a change in the database***, thereby initiating a timer,
> >
> > wherein the ***timer resets when the application server detects an additional change in the database before a timeout interval***, measured from the timestamp, elapses; and

> wherein the timer times out when the application server detects no additional change in the database after the ***timeout interval***, measured from the timestamp, elapses; and
>
> a production station coupled to the application server and configured to automatically produce an optical storage medium comprising one or more selected medical images from the database based on when the timer times out, wherein the medical image data is formatted in a standard medical imaging format used by a computer configured for viewing the medical image data.

The parties dispute the meaning of the phrase "wherein the timer resets when the application server detects an additional change in the database before a timeout interval." As with Claim 1, the parties' dispute is over the time and range of detection referred to by the "detects" step. Pacsgear's error lies in its conflation of the concepts of time and range of detection. The Court construes the disputed terms in Claim 8 in a manner consistent with its construction for Claim 1. Datcard proposes that the word "timer" refers to "a device which keeps track of time." It is not clear whether Pacsgear disputes this position. The Court does not need to construe claim language not in dispute.

Thus, consistent with its construction for Claim 1, the Court finds that the time of detection for the "detects" step is *after* the expiry of the timeout interval, whereas the range for detection is *before*.

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IV. CONCLUSION

The Court adopts the constructions set forth in this opinion for the disputed claim terms in this suit. The constructions shall govern all proceedings in this case.

Search and Burn claims	**Claim Construction**
"related medical image data" ('164), "additional medical data . . . related to the patient" ('597), "related data" ('174)	Data that is: (1) formatted in a standard medical imaging format; and (2) related to the selected medical imaging data. Such data types include images, patient demographics, and exam information such as patient name, age, exam number, exam modality, exam machine name, and exam date because all of the above are in the standard medical imaging format (in the header or the image). Data types not formatted in the standard medical imaging format are outside the scope of these terms.
"database" ('164, '174, '597)	A structured set of data held in a computer.
"automatically" ('597, '174)	Performing the corresponding claim step without first asking for user selection or direction for the step.
Whether the claim elements "printing" and "affixing" the label must occur sequentially ('164)	No.
HIPAA claims	**Claim Construction**
"a computer-implemented interface configured to receive two or more requests for production of stored	A system configured to receive two or more requests. This claim does not refer to user action.

medical data related to the first patient"	
"an identification specific to the computer-readable medium"	A unique identification for each instance of the computer-readable medium (e.g. each CD).
Timeout claims	**Claim Construction**
"detecting whether a server has changed within a timeout period after receiving medical image data or related data"	Time of detection is *after* the timeout interval expires. The range of detection is *before*. The timeout period is a predefined period of time. For a fuller discussion of the concepts "time of detection" and "range of detection," refer to parts (a) and (b) of Section III.C.i. *Supra* at 27-31.
"wherein the timer resets when the application server detects an additional change in the database before a timeout interval."	Time of detection is *after* the timeout interval expires. The range of detection is *before*. The timeout interval is a predefined period of time. For a discussion of the concepts of "time of detection" and "range of detection," refer to parts (a) and (b) of Section III.C.i. *Supra* at 27-31.
"timer"	No construction necessary at this time given the absence of a dispute.

IT IS SO ORDERED.

DATED: October 26, 2012

Mariana R. Pfaelzer

Hon. Mariana R. Pfaelzer
United States District Judge

Link: 64

UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA
WESTERN DIVISION

DATCARD SYSTEMS, INC.
Plaintiff,
v.
PACSGEAR INC.
Defendant.

Case No. 8:10-cv-01288-MRP-VBK

Order Re DatCard Inc.'s Motion for Summary Judgment of Infringement of U.S. Patents 7,783,174 and 7,734,157

I. INTRODUCTION

DatCard Systems, Inc. ("DatCard") has sued Pacsgear, Inc. ("Pacsgear") for patent infringement. The asserted patents are U.S. Patent Nos. 7,183,174 (filed Jun. 12, 2009) ("the '174 patent") and 7,734,157 (filed Jun. 24, 2009) ("the '157 patent"). The patents generally relate to technology for transmitting medical images (like MRI images) to compact discs ("CDs"). DatCard moves for summary judgment of infringement. The accused product is Pacsgear's "MediaWriter." DatCard argues that Pacsgear's customers directly infringe Claims 1-4 and 7 of the '174 patent and that Pacsgear itself indirectly infringes under a theory of

contributory infringement. As to the '157 patent, DatCard argues that Pacsgear directly infringes Claims 7 and 12. For the reasons provided below, the Court denies DatCard's motion of summary judgment of infringement for the '174 patent. The Court grants DatCard's motion for summary judgment of infringement for the '157 patent as to certain versions of MediaWriter (versions 4.0 and earlier) but denies the motion as to versions 4.0.1 and beyond.

II. LEGAL PRINCIPLES

A. Summary Judgment

The Court shall grant summary judgment if: (1) the movant shows that there is no genuine dispute as to any material fact; and (2) the movant is entitled to judgment as a matter of law. Fed. Rule Civ. Proc. 56(c); *see Celotex Corp. v. Catrett*, 477 U.S. 317, 322 (1986); *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242 (1986). The Court must: (1) identify material facts by reference to the governing substantive law, *Anderson*, 477 U.S. at 248; (2) disregard irrelevant or unnecessary factual disputes, *id.*; and (3) view facts and draw reasonable inferences in favor of the nonmoving party, *Scott v. Harris*, 550 U.S. 372 (2007).

B. Infringement

Determining patent infringement is a two-step process. *Hearing Components, Inc. v. Shure Inc.*, 600 F.3d 1357, 1370 (Fed. Cir. 2010). First, the asserted patent claim must be construed as a matter of law. *Id.* Second, the properly construed

claims must be compared to the accused product. *Id.* "An infringement issue is properly decided upon summary judgment when no reasonable jury could find every limitation recited in the properly construed claim is or is not found in the accused device either literally or under the doctrine of equivalents."*Gart v. Logitech, Inc.*, 254 F.3d 1334, 1339 (Fed. Cir. 2001).

III. ANALYSIS

A. The Court Denies DatCard's Motion for Summary Judgment of Infringement for the '174 Patent

Claim 1 of the '174 patent is a system claim. *Id.* at col. 9 II. 25-47. One of the claim elements is "a search module configured to ***automatically*** search the database for ***related data*** based on the user selection . . . ." *Id.* at col. 9 II. 35-36 (emphasis added). The Court has previously issued a Claim Construction order in this case. ECF No. 135. Pursuant to that Order, "automatically" means "without user selection or direction," whereas "related data" refers to "[d]ata that is: (1) formatted in a standard medical imaging format; and (2) related to the selected medical imaging data." *Id.* at 34.

The MediaWriter's search module is configured to search for diagnostic reports such as "HL7" reports. *See* Mot. at 14 (citing Ex. 2 at 34:8-35:3, 38:25-39:12, Ex. 23 at 58). These reports are stored in textual format – not in any standard medical imaging format. *See* Mot. at 14 (referring to diagnostic reports prepared by

radiologists as "textual reports"). On this ground alone, DatCard fails to establish its entitlement to summary judgment of infringement.

Furthermore, DatCard argues, "Specifically, ***when the 'Include Reports" button is selected***, a Media Writer uses a unique identification number associated with the selected medical image data to search the local drive for related reports with a matching identification number." *Id.* (citing Ex. 2 at 34:8-35:3, 38:25-39:12, Ex 23 at 58) (emphasis added). But the Court has construed "automatically" to mean "***without*** user selection or direction." ECF No. 135 at 34. By conceding that the MediaWriter's search module solicits user selection of the "Include Reports" button, DatCard undercuts its own argument. On this separate ground alone, DatCard fails to establish its entitlement to summary judgment of infringement.

Given the missing claim limitations in the accused product, the MediaWriter, DatCard is not entitled to summary judgment of infringement as a matter of law. Consequently, the Court denies DatCard's motion of summary judgment of infringement as to Claims 1-4 and 7 of the '174 patent with respect to Pacsgear's MediaWriter product.

B. The Court Denies in Part and Grants in Part DatCard's Motion for Summary Judgment of Infringement as to the '157 Patent

In its motion for summary judgment of infringement, DatCard argues that the accused product, Pacsgear's MediaWriter, satisfies each element of claims 7 and 12 of the '157 patent. Both claims require "a system . . . comprising . . . an image

production module that is configured . . . to automatically transmit . . . audit data . . . wherein the audit data comprises at least ***an identification specific to the computer-readable medium*** . . . .” ’157 at col. 10 II. 12-34, 50 (emphasis added). The Court has previously construed “an identification specific to the computer-readable medium” to mean “[a] unique identification for each instance of the computer-readable medium (e.g. each CD).” ECF No. 145 at 35.

Certain versions of MediaWriter (versions 4.0.1 and later) lack a unique identification for each instance of the computer-readable medium, e.g., each CD. These MediaWriter versions feature an identification called “Job ID.” But “Job ID” is not unique to each CD. Consequently, DatCard is not entitled to summary judgment of infringement as to MediaWriter versions 4.0.1 and beyond. Other versions of MediaWriter (versions 4.0 and earlier) feature an identification called “disc ID.” Disc IDs are unique for each CD and therefore constitute “an identification specific to the computer-readable medium.” Pacsgear does not dispute that the disc ID satisfies the appropriate construction of this limitation. Opp. at 19 n.13.

“Whenever a patentee with the burden of proof seeks summary judgment of infringement, it must make a prima facie showing of infringement as to each accused device before the burden shifts to the accused infringer to offer contrary evidence.” *L & W, Inc. v. Shertech, Inc.*, 471 F.3d 1311, 1318 (Fed. Cir. 2006). No

genuine issues of material fact remain as to all other claim limitations for Claims 7 and 12 of the '157 patent with respect to versions 4.0 and earlier of MediaWriter featuring disc IDs. *See* Mot. at 17-25. Because the Court finds that DatCard has made its prima facie showing of infringement, the burden shifts to Pacsgear to offer contrary evidence – which Pacsgear has failed to do.

Consequently, DatCard has proven by a preponderance of the evidence that each claim limitation of Claims 7 and 12 of the '157 patent is found in MediaWriter versions 4.0 and earlier. Thus, DatCard is entitled to summary judgment of infringement of Claims 7 and 12 of the '157 patent with respect to MediaWriter versions 4.0 and earlier. The Court notes that it has decided, in a separate order, that Claims 7 and 12 of the '157 patent are obvious. See ECF No. 74 (Pacsgear's motion for summary judgment of obviousness-based invalidity).

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IV. CONCLUSION

The Court denies DatCard's motion of summary judgment of infringement as to Claims 1-4 and 7 of the '174 patent with respect to Pacsgear's MediaWriter product. The Court denies DatCard's motion for summary judgment of infringement as to Claims 7 and 12 of the '157 patent with respect to certain versions of the MediaWriter (versions 4.0.1 and later). The Court grants DatCard's motion for summary judgment of infringement as to Claims 7 and 12 of the '157 patent with respect to other versions of the MediaWriter (versions 4.0 and earlier). But Claims 7 and 12 are invalid for obviousness. *See* ECF No. 74 (order pending).

IT IS SO ORDERED.

DATED: April 01, 2013

Mariana R. Pfaelzer

Hon. Mariana R. Pfaelzer
United States District Judge

Link: 68

UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA
WESTERN DIVISION

DATCARD SYSTEMS, INC., a California corporation

Plaintiff,

v.

PACSGEAR, INC., a California corporation

Defendant.

Case No. CV-10-01288-MRP

Order Granting Pacsgear Inc.'s Motion for Summary Judgment of Non-Infringement of the "Search/Burn" Patents

I. Introduction

DatCard Systems, Inc. ("DatCard") has sued Pacsgear, Inc. ("Pacsgear") for patent infringement. The asserted patents relate to technology for searching and burning medical images. They are U.S. Patent Nos. 7,302,164 ("the '164 patent"), 7,729,597 ("the '597 patent"), and 7,783,174 ("the '174 patent") (collectively the "Search/Burn patents"). Pacsgear seeks summary judgment of non-infringement with respect to Claims 9-13, 15-17, and 21 of the '164 patent, Claims 1 and 6 of

the '597 patent, and Claims 1-5, 7-10, and 13 of the '174 patent. For the reasons provided below, the Court grants Pacsgear's motion.

II. Legal Principles

A. Summary Judgment

The Court shall grant summary judgment if: (1) the movant shows that there is no genuine dispute as to any material fact; and (2) the movant is entitled to judgment as a matter of law. Fed. R. Civ. P. 56(c); *see Celotex Corp. v. Catrett*, 477 U.S. 317, 322 (1986); *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242 (1986). The Court must: (1) identify material facts by reference to the governing substantive law, *Anderson*, 477 U.S. at 248; (2) disregard irrelevant or unnecessary factual disputes, *id.*; and (3) view facts and draw reasonable inferences in favor of the nonmoving party, *Scott v. Harris*, 550 U.S. 372 (2007).

The Court cannot grant summary judgment if the dispute about a material fact is such that a reasonable jury could return a verdict for the nonmoving party. *Id.* Faced with a properly supported summary judgment motion, the nonmoving party may not rest upon mere allegations or denials of its pleading but must set forth specific facts showing a genuine issue for trial. *Id.* "Where the record taken as a whole could not lead a rational trier of fact to find for the nonmoving party, there is no genuine issue for trial." *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 587 (1986).

B. Non-Infringement

"Summary judgment of non-infringement requires a two-step analytical approach. First, the claims of the patent must be construed to determine their scope. Second, a determination must be made as to whether the properly construed claims read on the accused device." *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1304 (Fed. Cir. 1999). "[S]ummary judgment of non-infringement can only be granted if, after viewing the alleged facts in the light most favorable to the non-movant, there is no genuine issue whether the accused device is encompassed by the claims." *Id.*

III. Discussion

System claims 9-13, 15-17, and 21 of the '164 patent require a search for "***related medical image data***." Claims 1 and 6 of the '597 patent require a search for "***additional medical data***" related to the patient. Finally, claims 1-5, 7-10, and 13 of the '174 patent require searching for "***related data***." On October 26, 2012, the Court issued a Claim Construction Order in this matter. Doc. 145. The Court construed "related medial image data" ('164), "additional medical data . . . related to the patient" ('597), and "related data" ('174) as "[d]ata that is: (1) formatted in a standard medical imaging format, and (2) related to the selected medical imaging data." *Id.* at 34. "Such data types," the Court noted, "include images, patient demographics, and exam information such as patient name, age, exam number,

exam modality, exam machine name, and exam date because all of the above are in the standard medical imaging format (in the header or the image). Data types not formatted in the standard medical imaging format are outside the scope of these terms." *Id.*

Starting with version 3.0, the MediaWriter's search module began including diagnostic reports related to selected images. Ex. 258, Cavanaugh Dec., ¶¶2-17. These reports are not formatted in any standard medical imaging format. They are merely textual data. *See* Opp. at 4 (describing diagnostic reports as "textual data"). As such, they fall outside the scope of the asserted claims. The MediaWriter does not search for any other data formatted in a standard medical imaging format. The end result of executing a MediaWriter search is not substantially the same as the end result of the search module claimed in the patents. The MediaWriter search procures data in a textual format. The claimed search modules are directed to procuring related data in a standard medical imaging format. On the facts presented, no reasonable jury could deem textual data as equivalent to data formatted in a standard medical imaging format.

IV. Conclusion

The MediaWriter searches for diagnostic reports. These reports are stored in a textual format – not a standard medical imaging format. In light of the specification, the Court has construed the terms "related medical image data"

('164, Cls. 9-13, 15-17, 21), "additional medical data related to the patient ('597, Cls. 1, 6), or "related data" ('174 Cls. 1-5, 7-10, and 13) as limited to data in a standard medical imaging format because that is what the patentee disclosed as the invention. The patentee should get what he disclosed. No reasonable jury could find infringement here (either literal or under the doctrine of equivalents). Consequently, the Court grants Pacsgear's motion for summary judgment that the MediaWriter does not infringe, either literally or under the doctrine of equivalents, Claims 9-13, 15-17, and 21 of the '164 patent, Claims 1 and 6 of the '597 patent, and Claims 1-5, 7-10, and 13 of the '174 patent.

IT IS SO ORDERED.

DATED: April 01, 2013

Mariana R. Pfaelzer

Hon. Mariana R. Pfaelzer
United States District Judge

U 7312126

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office

August 19, 2011

THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THIS OFFICE OF:

U.S. PATENT: *7,302,164*
ISSUE DATE: *November 27, 2007*

By Authority of the
Under Secretary of Commerce for Intellectual Property
and Director of the United States Patent and Trademark Office

P. SWAIN
Certifying Officer

US007302164B2

(12) **United States Patent**
Wright et al.

(10) **Patent No.: US 7,302,164 B2**
(45) **Date of Patent: Nov. 27, 2007**

(54) **SYSTEM AND METHOD FOR PRODUCING MEDICAL IMAGE DATA ONTO PORTABLE DIGITAL RECORDING MEDIA**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 945 days.

(21) Appl. No.: **09/761,795**

(22) Filed: **Jan. 17, 2001**

(65) **Prior Publication Data**

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Related U.S. Application Data

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(51) **Int. Cl.**
H04N 5/91 (2006.01)

(52) **U.S. Cl.** **386/95**; 386/112; 386/126

(58) **Field of Classification Search** 386/46, 386/95, 125, 126; 600/407; 709/219; 705/2
See application file for complete search history.

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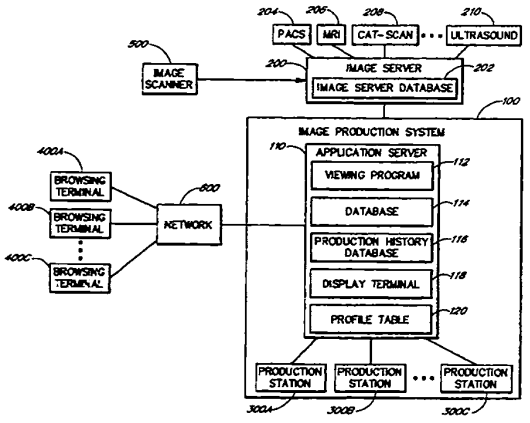
Primary Examiner—Huy Nguyen
(74) *Attorney, Agent, or Firm*—Knobbe, Martens Olson & Bear LLP

(57) **ABSTRACT**

This application discloses a system for recording medical image data for production on a portable digital recording medium such as CDs and DVDs. This system includes a receiving module, a processing module and an output module, with viewing program for viewing medical image data stored on the portable digital recording medium. It also discloses a method of storing medical image data on a portable digital recording medium, including the steps of receiving the medical image data, processing the data and storing the data on the portable digital recording medium, with a viewing program for viewing medical image data stored on the portable digital recording medium. It further discloses a method of selecting medical image data for recording on a portable digital recording medium, including the steps of connecting a browsing terminal to a computer database that stores the medical image data, selecting a first set of the medical image data from the computer database, and recording the selected first set of medical image data on the portable digital medium, with a viewing program for viewing the medical image data stored on the portable digital recording medium. It also discloses the method and system of retrieving medical image data that are related to the received/selected original medical image data, and recording the original and related medical image data on a portable digital recording medium.

27 Claims, 5 Drawing Sheets



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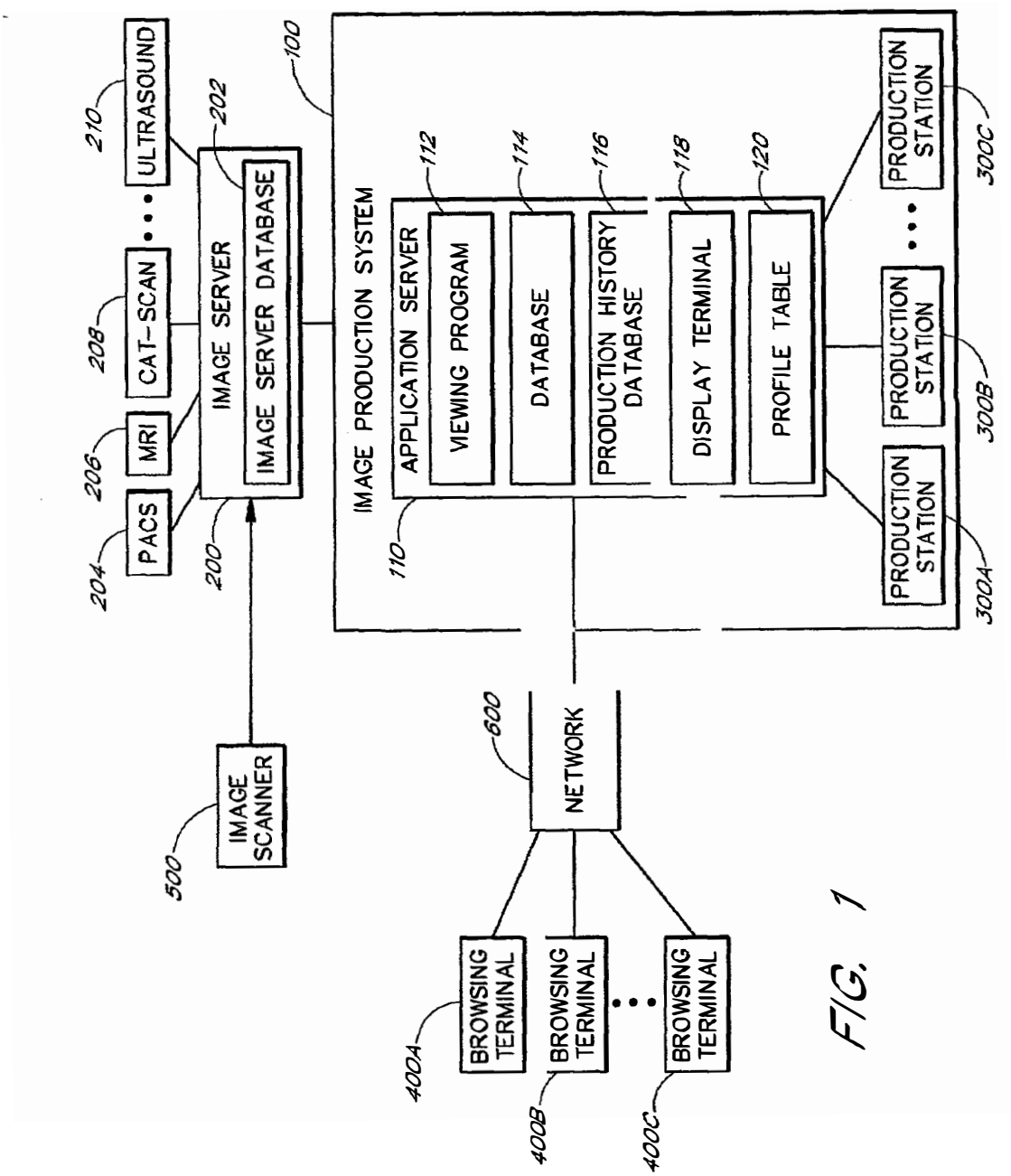


FIG. 1

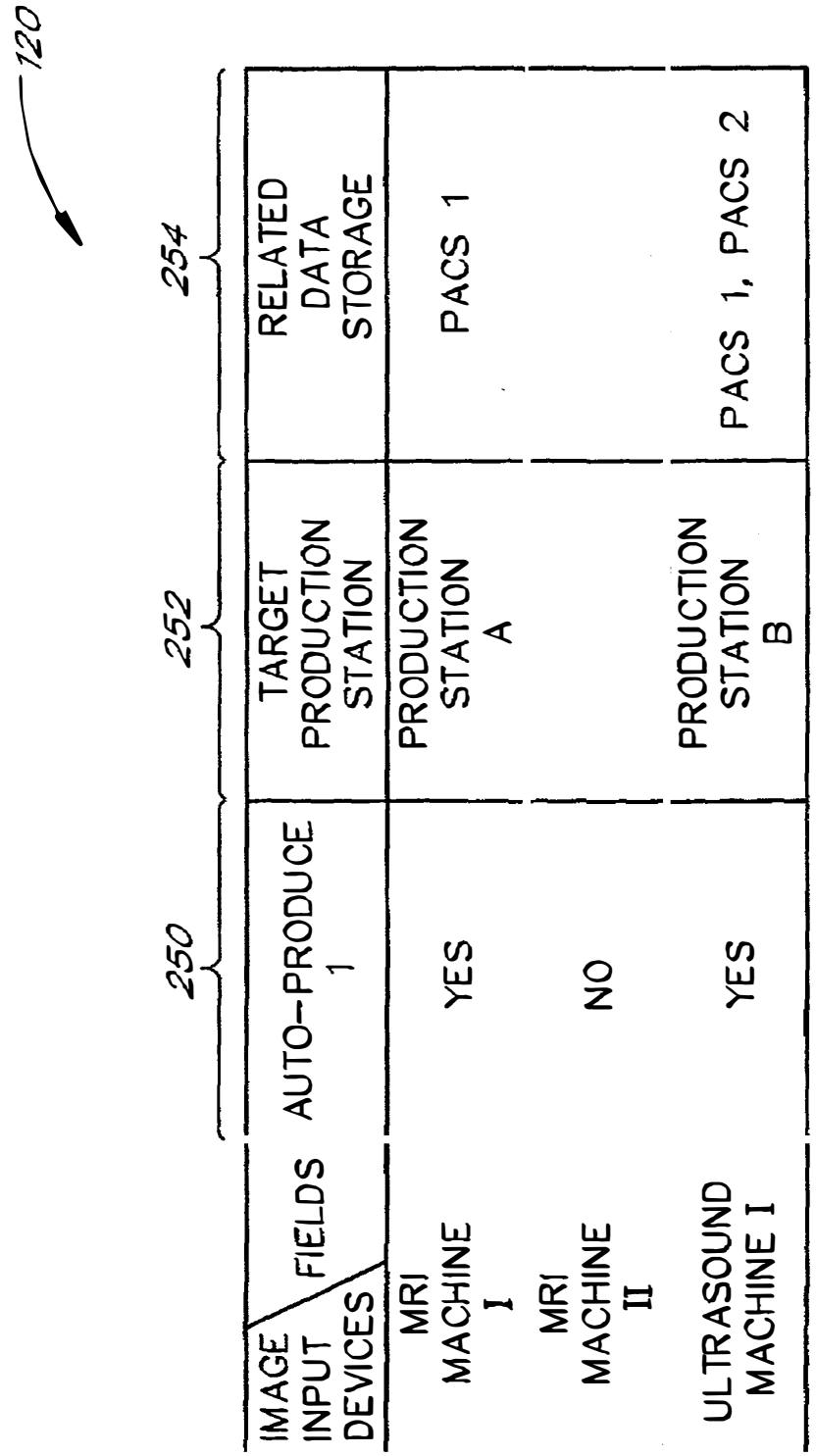
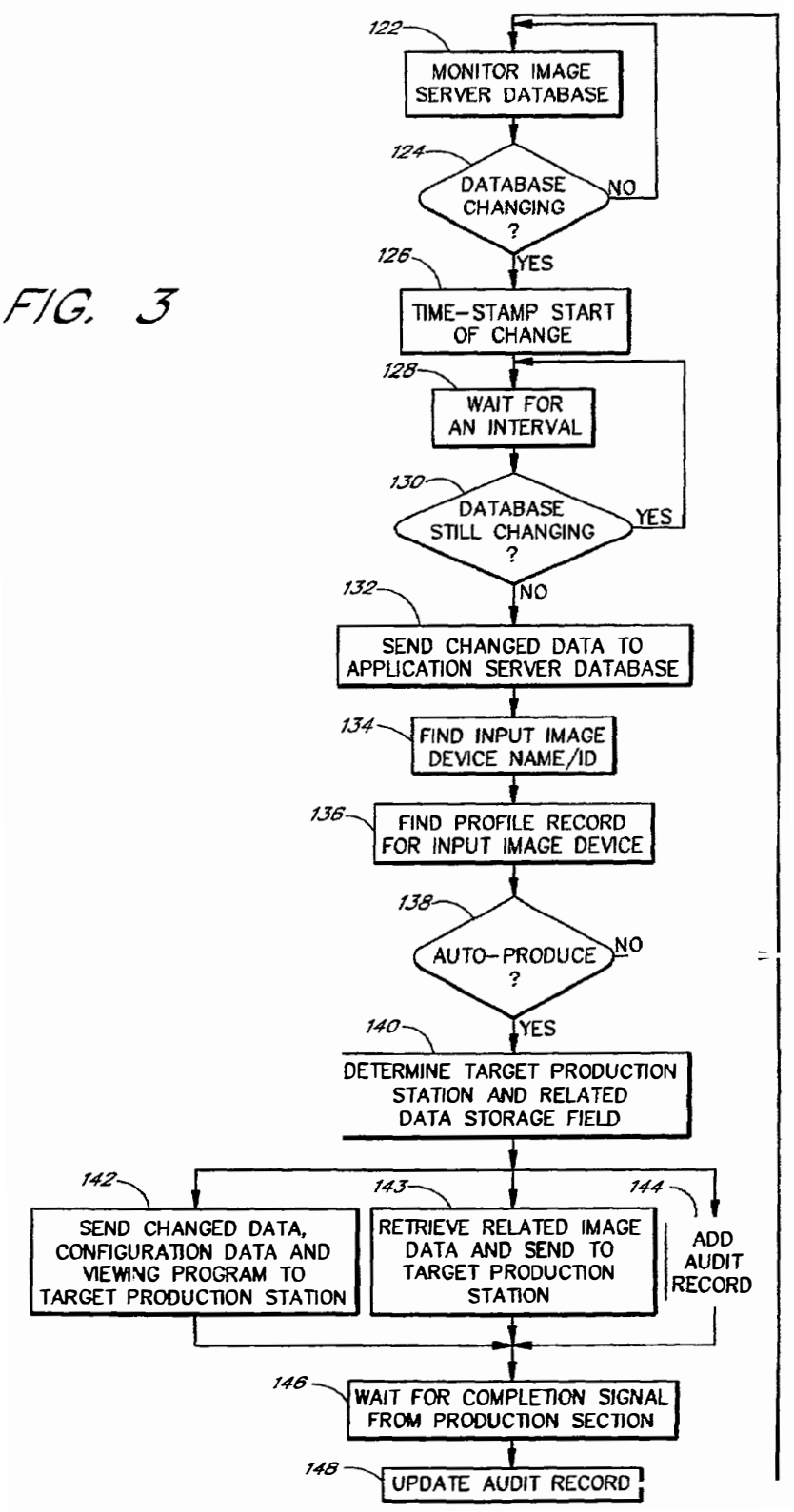


FIG. 2

FIG. 3



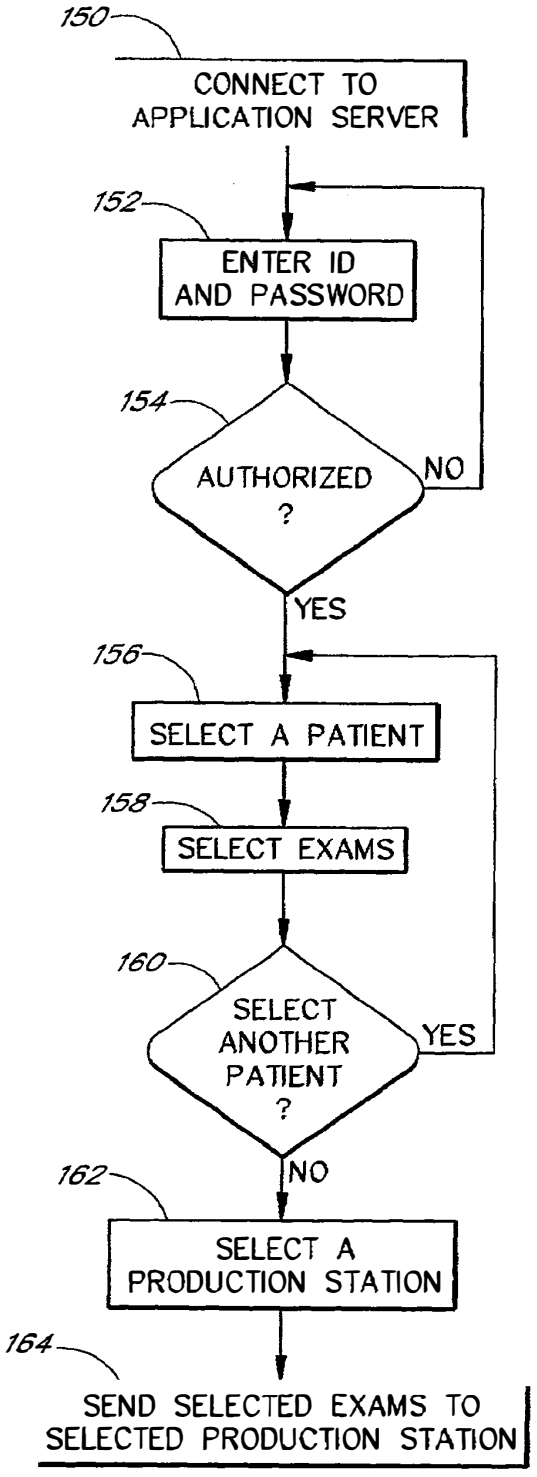


FIG. 4

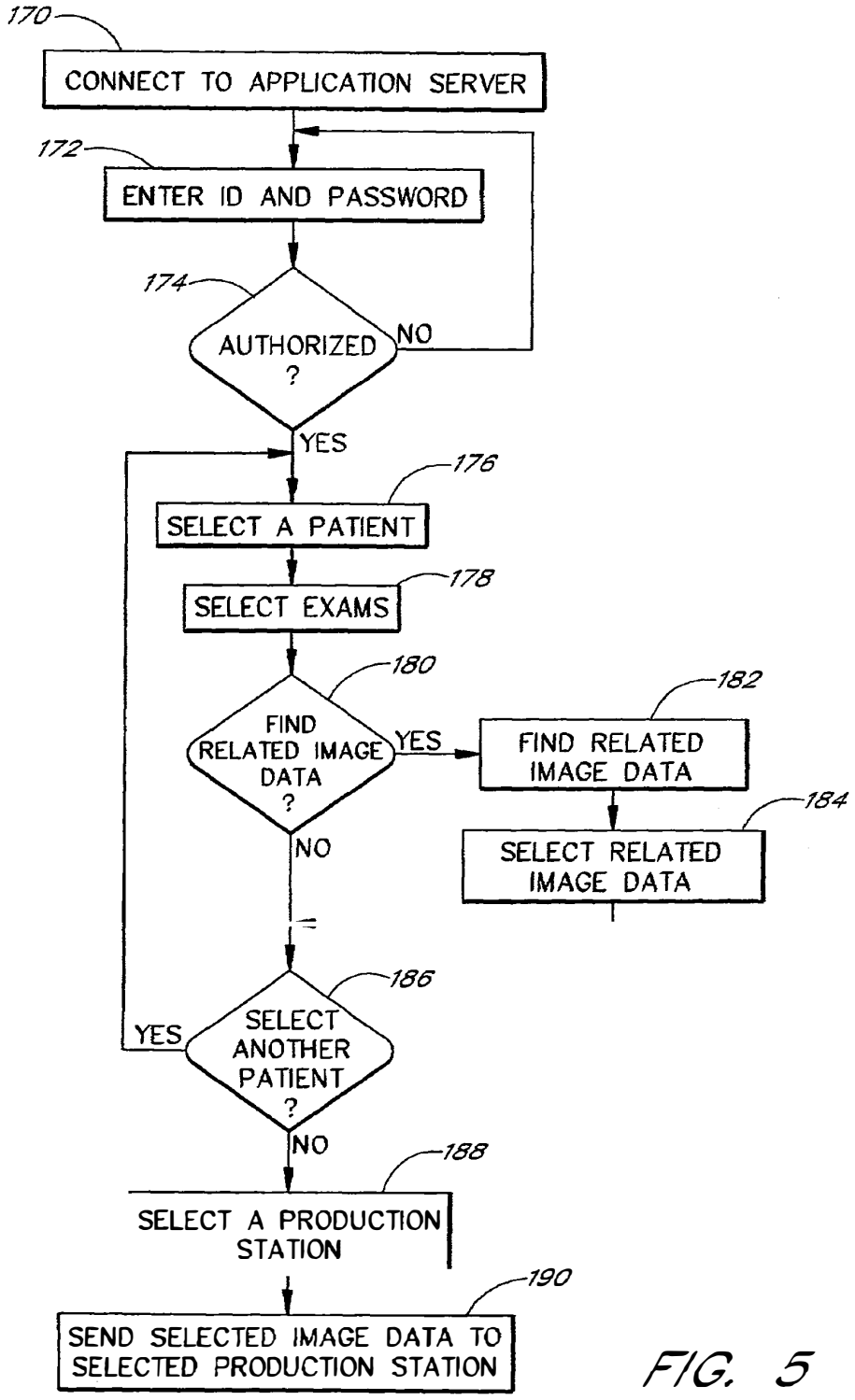


FIG. 5

SYSTEM AND METHOD FOR PRODUCING MEDICAL IMAGE DATA ONTO PORTABLE DIGITAL RECORDING MEDIA

CROSS REFERENCE TO RELATED APPLICATIONS

This non-provisional application claims priority date from the provisional patent application Ser. No. 60/181,985, titled "Medical Information System" and filed Feb. 11, 2000.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a system and method for the production of medical image data on portable digital recording media such as compact discs. More particularly, it relates to a system and method for receiving medical image data, processing medical image data, and transmitting medical image data to be recorded on a portable digital recording medium.

2. Description of the Related Art

Since the invention of the x-ray film, film has been the predominant multipurpose medium for the acquisition, storage, and distribution of medical images. However, the storage and distribution of film often requires considerable expenses in labor and storage space.

Today's modern hospitals utilize computer-aided imaging devices such as Computed Tomography (CT), Digital Subtracted Angiography, and Magnetic Resonance Imaging (MRI). These digital devices can generate hundreds of images in a matter of seconds. Many hospitals require these images to be printed on film for storage and distribution. To print complete sets of medical images from these digital devices, the cost in film material, storage space, and management efforts is often very high.

Some radiology departments have installed digital image storage and management systems known as PACS (Picture Archive Communication Systems). PACS are capable of storing a large amount of medical image data in digital form. PACS are made by manufacturers including GE, Siemens, and Fuji.

To ease the communication of data, the DICOM (Digital Imaging and Communications in Medicine) standard was developed by ACR-NEMA (American College of Radiology-National Electrical Manufacturer's Association) for communication between medical imaging devices and PACS. In addition to the examined images, patient demographics, and exam information such as patient name, patient age, exam number, exam modality, exam machine name, and exam date can also be stored and retrieved in DICOM compatible data format. A DICOM file stores patient and exam information in the header of the file, followed by the exam images. PACS store medical image data in DICOM format.

Digital medical image data can be stored on PACS and distributed using the Internet. However, many physicians' offices do not have the bandwidth suitable for fast download of medical image data. The concerns for medical data privacy and Internet security further reduce the desirability of Internet distribution.

SUMMARY OF THE INVENTION

The claimed system allows for digital medical image data to be produced on a portable digital recording medium such as a CD. A CD containing the medical image data can be distributed to physicians, hospitals, patients, insurance companies, etc. One embodiment of the claimed system allows for medical image data to be placed on a CD along with a viewing program, so that a user can use any computer compatible with the CD to view the medical image data on the CD. One embodiment of the claimed system allows for searching medical exam data that are related and placing such data on the same CD.

One embodiment of the claimed system comprises a receiving module configured to receive medical image data, a processing module configured to process the received medical image data, and an output module configured to transmit the processed medical image data to a production station configured to produce the transmitted medical image data on portable digital recording medium, such as a CD. In one embodiment, the output module transmits a viewing program configured to view medical image data to the production station so that the viewing program is produced on the same CD as the medical image data. In another embodiment, the CD already contains the viewing program before the medical image data is transmitted to the CD production station.

In one embodiment of the claimed system, the processing module is configured to create and store audit information of the portable digital recording medium produced by the production station.

In another embodiment of the claimed system, the processing module is configured to identify the originating image input device of the received medical image data, and determine, on the basis of the originating image input device, whether to transmit the received medical image data to a production station. The processing module also selects, on the basis of the originating image input device, one of multiple production stations as the target production station.

Yet another embodiment of the claimed system is configured to retrieve medical image data that are related to the received medical image data, and transmit the retrieved related image data to the production station. In one embodiment, exam images of the same patient are considered related. In another embodiment, exam images of the same patient and the same modality are considered related. For example, two x-ray exams on the left hand of the same patient are considered related. In yet another embodiment, exam images of the same patient, the same modality and taken within a specified date range are considered related. For example, two x-ray exams on the left hand of the same patient taken within a two-month period are considered related. A hospital may also determine other scenarios of relatedness.

One claimed method comprises the steps of connecting a browsing terminal to a computer database configured to store medical image data, selecting medical image data from medical image data stored on the database, and recording the selected medical image data on portable digital recording medium. In one embodiment, the claimed method also comprises a step of recording a viewing program configured to view medical image data on the portable digital recording medium.

One embodiment of the claimed method further comprises the steps of finding and retrieving medical image data that are related to the selected medical image data, and recording related image data to portable digital recording medium.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates one embodiment of an image production system comprising an application server and portable digital recording medium production stations.

FIG. **2** illustrates sample records of one embodiment of an image input device profile table.

FIG. **3** illustrates a process of receiving image data from image server, processing received image data, and transmitting such data to the production station. This process also retrieves and transmits related image data for production.

FIG. **4** illustrates a process of a user selecting and ordering the production of image data stored on the application server.

FIG. **5** illustrates a process of a user selecting and ordering the production of image data stored on the application server, with the option of selecting and ordering the production of related image data.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** illustrates one embodiment of an image production system **100** comprising an application server **110** and one or more portable digital recording medium production stations **300**A, **300**B and **300**C. In the preferred embodiment, the production stations **300**A, **300**B and **300**C are CD (Compact Disc) production stations. Digital portable recording medium comprises CDs and DVDs (Digital Versatile Disc or Digital Video Disc). CDs may comprise CD-ROM (Compact Disc Read Only Memory), CD-R (Compact Disc Recordable), and CD-RW (Compact Disc Recordable and Writable). DVDs may comprise DVD-ROM (DVD Read Only Memory), DVD-R (DVD Recordable) and DVD-RAM (a standard for DVDs that can be read and written many times). Thus, although the following description refers primarily to CDs, those of ordinary skill in the art will understand that any suitable portable digital recording medium can be substituted for CDs.

The application server **110** is connected to one or more physician browsing terminals **400**A, **400**B and **400**C through a computer network **600**. Each physician browsing terminal **400**A, **400**B or **400**C comprises a browsing program such as Internet Explorer or Netscape Communicator. Physicians or their assistants launch the browsing program to access the application server **110** through the network **600** in order to select medical image data stored on the application server database **114** to be produced by a production station **300**A, **300**B or **300**C. In the preferred embodiment, the physician browsing terminals **400**A, **400**B and **400**C are connected to the application server through an Intranet. One embodiment of the Intranet utilizes TCP/IP network protocol. The Intranet can connect one radiology department, multiple departments within a hospital, or multiple hospitals. In another embodiment the browsing terminals **400**A, **400**B and **400**C are connected to the application server **110** through the Internet.

Still referring to FIG. **1**, the application server **110** is also connected to an image server **200**. The image server **200** is further connected to image input devices such as PACS **204**, MRI machines **206**, CT-scan machines **208**, ultrasound machines **210**, etc. In the preferred embodiment, the image server **200** is a DICOM image server configured to receive and store medical image data in DICOM format. In operation, the image server **200** receives medical image data from image input devices such as PACS **204**, MRI machines **206**, CT-scan machines **208** and ultrasound machines **210** and stores such image data in the image server database **202**. A high-resolution image scanner **500** is also connected to the image server **200**, so that medical image data stored on film can be scanned on the image scanner **500**, transmitted to the image server **200** and stored in the image server database **202**. In one embodiment, the image scanner **500** also converts the scanned image to DICOM format. The application server **110** receives input image data from the image server database **202**, processes the received image data, and sends the image data to one of the production stations **300**A, **300**B or **300**C to produce CDs.

The application server **110** comprises a viewing program **112**, an application server database **114** that stores image data received from the image server **200**, a production history database **116** that stores audit records on each CD produced, a display terminal **118** for programming and operating the application server **110** by a programmer or physician, and an image input device profile table **120**.

Still referring to FIG. **1**, the viewing program **112** is configured to allow users to read and manipulate medical image data. The viewing program **112** comprises multiple image manipulation functions, such as rotating images, zooming in and zooming out, measuring the distance between two points, etc. The viewing program **112** also allows users to read the patient demographics and exam information associated with the image data. The viewing program **112** used in the preferred embodiment is produced by eFilm Medical Inc. located in Toronto, Canada. The viewing program **112** used in the preferred embodiment is an abbreviated version with fewer functions and takes less storage space, in order to maximize the storage space for image data on a CD. The image server **200** used in the preferred embodiment is also made by eFilm Medical Inc.

The CD production stations **300**A, **300**B and **300**C in the preferred embodiment are produced by Rimage Corporation in Edina, Minn. Details about the Rimage CD production stations can be found in U.S. Pat. Nos. 5,542,768, 5,734,629, 5,914,918, 5,946,276, and 6,041,703, which are incorporated herein by reference in their entirety.

The application server **110** in the preferred embodiment runs on a personal computer running a 400 MHz Celeron or Pentium II/III chip, with Windows 98 or NT as the operating system.

FIG. **2** illustrates sample records of one embodiment of an image input device profile table **120**. The image input device profile table **120** contains a profile record for each image input device. Each image input device's profile record comprises: (1) an "auto-produce" logical field **250** indicating whether medical image data from this image input device should be produced on CD automatically by the image production system **100**, (2) a "target production station" field **252** identifying one of the production stations **300**A, **300**B or **300**C on which medical image data is to be produced, and (3) a "related data storage" **254** field identifying the medical image data storage units in which to search for the related image data. A medical image data storage unit is a storage unit that stores medical image data and is connected to the application server **110**. In one embodiment, a medical image data storage unit is connected to the application server **110** through the image server **200**. In the preferred embodiment, PACS **204** is such a medical image data storage unit.

In FIG. **2**, the sample profile table **120** contains profile records for MRI Machine I, MRI Machine II, and Ultrasound Machine I. For MRI Machine I, the "auto-produce" field **250** contains a "yes" value, directing the image production system **100** to automatically produce image data originating from MRI Machine I on portable digital record-

ing medium. Its "target production station" field **252** contains a "Production Station A" value, directing the image production system **100** to produce image data originating from MRI Machine I on production station A. Its "related data storage" field **254** is "PACS I", directing the image production system **100** to retrieve related medical image data from PACS I. For MRI Machine II, the "auto-produce" field **250** is "no", directing the image production system **100** to not automatically produce image data originating from MRI Machine II on portable digital recording medium. Since image data from MRI Machine II will not be automatically produced, the "target production station" field **252** and the "related data storage" field **254** are irrelevant. For Ultrasound Machine I, the "auto-produce" field **250** is "yes", and its "target production" filed **252** is "Production Station B". Its "related data storage" field **254** contains a value of "PACS I, PACS II", directing the image production system **100** to search PACS I and PACS II for related medical image data.

FIG. **3** illustrates a process of the application server **110** receiving image data from the image server **200**, processing the received image data, and transmitting such data to the production station **300**A, **300**B or **300**C. The application server **110** continuously monitors the image server database **202** in step **122**. In one embodiment, the application server continuously "pings" the network address corresponding to the image server **200** on the network that connects the application server **110** with the image server **200**.

Still referring to FIG. **3**, the application server **110** determines if the image server database **202** is changing, in step **124**. In the preferred embodiment, the application server **110** makes that determination by detecting whether the image server database **202** is increasing in size. If there is no change in the image server database **202**, then the application server **110** returns to step **122** to continue monitoring. If there is change in the image server database **202**, then the application server **110** proceeds to step **126** and time-stamps the moment that the change started. The application server **110** then proceeds to step **128** and waits for an interval, typically 35 to 65 seconds. After the interval, the application server **110** checks whether the image server database **202** is still changing, in step **130**. If the image server database **202** is still changing then the application server **110** returns to step **128** to wait for another interval. If the image server database **202** is no longer changing, then the application server **110** proceeds to step **132** and copies the data changed since the time-stamped moment. This changed data is copied from the image server database **202** to the application server database **114**.

The application server **110** proceeds to step **134** and finds the input image device name or identification number from the newly received image data. In the preferred embodiment, image data from the image server database **202** are stored in DICOM format, and the input image device name or identification number is stored in the header of the DICOM format image data file. The input image device name/ID indicates the origin of the newly received data. The application server **110** proceeds to step **136** and uses the found input image device name/ID to find a corresponding profile record in the image input device profile table **120**. If the profile record has an "auto-produce" field **250** with a "no" value, the application server **110** returns from step **138** to step **122** to continue monitoring the image server database **202**. If the "auto-produce" field **250** contains a "yes" value, the application server **110** proceeds from step **138** to step **140**, and determines the target production station **300**A, **300**B or **300**C from the "target production station" field **252** of the profile record. In step **140**, the application server **110** also determines the value in the "related data storage" field **254** of the profile record.

Still referring to FIG. **3**, in step **142**, the application server **110** sends a copy of the newly received data, along with a copy of the viewing program **112**, to the target production station **300**A, **300**B or **300**C identified in step **140**. With the viewing program attached, the image data on each CD produced by the target production station **300**A, **300**B or **300**C can be viewed on any computer that accepts the CD, regardless of whether that computer has its own viewing program installed. In one embodiment, the data received in step **132** is stored in the application server database **114** before it is transmitted to the target production station **300**A, **300**B or **300**C in step **142**. In another embodiment, the application server **110** transmits the data received in step **132** to the target production station **300**A, **300**B or **300**C, without storing a copy of the data in the application server database **114**.

In one embodiment, the application server **110** does not send a copy of the viewing program **112** to the target production station during step **142**. Rather, the application server **110** sends a copy of the received medical image data to the production station **300**A, **300**B or **300**C to be recorded on pre-burned CDs. Each pre-burned CD contains a viewing program already recorded onto the CD before step **142**.

In step **142**, the application server **110** also sends configuration data to the target production station **300**A, **300**B or **300**C. The configuration data comprises a label-printing file comprising the specification for printing labels on top of the CDs, and a "number of copies" value indicating the number of copies of CDs to be produced. A typical specification in the label-printing file may specify information such as patient name, exam modality, hospital name, physician name, production date, etc. to be printed by the target production station as a label on the top of each CD produced.

Still referring to FIG. **3**, in step **143**, the application server **110** searches the application server database **114** for image data related to the newly received data. The application server **110** then searches the PACS systems identified in the "related data storage" field **254** in step **140** for data related to the newly received data. Some PACS systems each comprise a primary image data storage and an archive image data storage, and the application server **110** searches both the primary image data storage and the archive image data storage on these PACS systems. The application server **110** is connected to the PACS systems through the image server **200**. The application server **110** retrieves found related data from the PACS systems and stores a copy of such found related data in the application server database **114**. The application server **110** sends a copy of related data that are found from the application server database **114** or the PACS systems to the target production station **300**A, **300**B or **300**C. The medical image data originally received in step **132** and the related medical image data are produced by the target production station **300**A, **300**B or **300**C on the same CDs for comparative study.

For each CD to be produced, the application server **110** adds one audit record to the production history database **116** in step **144**. The new audit record comprises the identification number of the CD and other relevant information about the CD, such as the physician who requested the production (if any), and the names of the patients whose exam images are on that CD.

Steps **142**, **143** and **144** may be executed immediately before, concurrent with, or immediately after one another.

The target production station **300**A, **300**B or **300**C produces the CDs containing the medical image data and the viewing program sent to it, and prints a label on top of every CD, corresponding to the specification in the label-printing file. The number of CDs produced corresponds to the "number of copies" number sent by the application server **110** in step **142**. When the target production station has produced the CDs, the production station returns a "completed" signal to the application server **110**. The application server **110** waits for this signal in step **146**.

Still referring to FIG. **3**, in step **148**, the application server **110** updates the audit records in the production history database **116** that were created in step **144**. For each CD produced, the application **110** server updates the date and time of production for that CD's audit record. The application server **110** also updates the status value for that CD's audit storage record from "processing" to "successful". The application server **110** then continues monitoring the image server database **202** as in step **122**.

FIG. **4** illustrates a process of a user selecting and ordering the production of image data stored on the application server **110**. A user, typically a physician or physician's assistant, accesses the application server database **114** from a browsing terminal **400**A, **400**B or **400**C connected to a network **600**. In one embodiment, the user launches a browser such as Microsoft Internet Explorer or Netscape Communicator, and specifies a network address corresponding to the application server **110**, in step **150**. In another embodiment, the user clicks a pre-defined icon that directly launches a browser connecting to the application server **110**. The application server **110** prompts the user to enter a password or an identification name coupled with a password, in step **152**. The application server **110** checks if the entered identification/password is authorized in step **154**. If the entered identification/password is not authorized the user is returned to step **152** to re-enter the identification/password, or disconnected from the application server **110**. If the entered identification/password is authorized then the user is allowed access to the application server database **114** and the application server **110** proceeds to step **156**.

Still referring to FIG. **4**, in step **156** the user is prompted to select a patient from a list of patients with exam images in the application server database **114**. The user is then shown a list of the selected patient's exams, and is prompted to select one or more exams of that patient, in step **158**. When the user indicates that he/she has completed selecting all exams for that patient, the user is asked in step **160** whether to select another patient from the list of patients. If the user answers "yes", the user is returned to step **156** to select another patient. If the user answers "no", the user proceeds to step **162**.

In another embodiment, when a user selects a patient, all exams belonging to that patient will be automatically selected without prompting for user selection. In yet another embodiment, the user is not prompted to select patients, but is only prompted to select exams from a list of all exams for all patients contained in the application server database **114**.

When the user indicates that he/she has completed selecting, the user is prompted to select a production station from a list of production stations **300**A, **300**B and **300**C in step **162**. The user is also prompted to enter additional label text to be printed as labels on the CDs to be produced, to supplement the text printed according to the specification of the label-printing file. The user can advantageously select the production station located closest to his/her office. In one embodiment, only one production station is connected to the application server **110**, and the lone production station will be the selected production station without prompting for user selection.

In one embodiment, the user is also prompted to select the number of copies of CDs to be produced. In another embodiment, the number of copies is set at one without prompting for user direction. As described above in connection with FIG. **3**, in step **164**, the application server **110** sends a copy of the image data of the selected exams for the selected patients to the selected production station, along with a copy of the viewing program **112**, and configuration data comprising a label-printing file, additional label text, and a number indicating the number of copies of CDs to be produced. The production station **300**A, **300**B or **300**C then produces one or more CDs containing the selected exams for the selected patients and the viewing program, with labels printed on top of the CDs according to the specification in the label-printing file and the user-entered additional label text.

In another embodiment, a user accesses the application server database **114** not from a browsing terminal **400**A, **400**B or **400**C, but directly from the display terminal **118**. In this embodiment the user directly proceeds from step **152**. In this embodiment the user is typically a programmer or operator of the image production system **100**.

FIG. **5** illustrates a process of a user selecting and ordering the production of image data stored on the application server **110**, with the additional option of selecting and ordering the production of related data for comparative study. As described above in connection with FIG. **4**, a user connects to the application server **110** from a browsing terminal **400**A, **400**B or **400**C in step **170**. The user enters identification information and a password in step **172**. Step **174** determines whether the user is authorized to access the application server database **114**. If authorized, the user is prompted to select a patient in step **176**, and selects exams of the selected patient in step **178**. The user is then asked in step **180** if he/she desires to find related data of that patient for comparative study.

If the user answers yes, the application server **110** then searches for related data. The application server **110** finds the image input device profile table **120** profile record corresponding to the image input device from which the selected data originates, identifies the list of PACS systems stored in the "related data storage" field **254**, and searches these PACS systems for related data. In another embodiment, once the user has selected a patient/exam combination, the application server **110** automatically searches for related data without asking for user direction. In this embodiment, the application server **110** alerts the user if related data are found. In one embodiment, the application server **110** also searches the application server database **114** for related medial image data.

Still referring to FIG. **5**, the user is then prompted to select all or some of the related data from the list of found related data for production, in step **184**. In another embodiment, all found related data are automatically selected by the application server **110** for production, without prompting for user selection.

The user is then prompted to select another patient in step **186**. After the user has completed selecting all patients, the user is prompted to select a CD production station **300**A, **300**B or **300**C in step **188**. The user is also prompted to enter additional label text. In step **190**, the application server **110** then sends a copy of the original and selected related data, along with a copy of the viewing program **112**, a number indicating the number of copies to be produced, additional

label text, and a label-printing file to the selected production station **300**A, **300**B or **300**C for production.

The above paragraphs describe the application server **110** with one database **114** for image data storage. In another embodiment, the application server **110** includes two databases for image data storage: a new data database and a storage data database. The new data database stores only the most recent batch of new data just received from the image server **200**. After the data in the new data database is sent to a production station **300**A, **300**B or **300**C, the application server **110** erases data in the new data database. The storage data database stores all data that has ever been received from the image server database **202**. In the processes described by FIG. **4** and FIG. **5**, a user selects images for production from the storage data database.

Several modules are described in the specification and the claims. The modules may advantageously be configured to reside on an addressable storage medium and configured to execute on one or more processors. The modules may include, but are not limited to, software or hardware components that perform certain tasks. Thus, a module may include, for example, object-oriented software components, class components, processes methods, functions, attributes, procedures, subroutines, segments of program code, drivers, firmware, microcode, circuitry, data, databases, data structures, tables, arrays, and variables. Modules may be integrated into a smaller number of modules. One module may also be separated into multiple modules.

Although the foregoing has been a description and illustration of specific embodiments of the invention, various modifications and changes can be made thereto by persons skilled in the art, without departing from the scope and spirit of the invention as defined by the following claims.

What is claimed is:

1. A system for selecting and automatically recording medical image data onto a data storage medium, the system being connected to a medical image server, the system comprising:

an application server;

a plurality of production stations;

a plurality of browsing terminals;

a network connecting the application server, the plurality of production stations and the plurality of browsing terminals, wherein the application server is configured to receive medical image data from the medical image server, the medical images received being formatted in a standard medical imaging format used by specialized computers configured for viewing medical images, the application server further comprising:

a selection module configured to allow a user to select selected medical image data via at least one of (a) a selected one of the plurality of browsing terminals and (b) the application server,

a search module configured to automatically search the medical image server for related medical image data that is related to the selected medical image data,

a configuration data module configured to allow a user to input identifying information relating to the selected medical image data,

a production station selection module configured to allow a user to select one of the plurality of production stations, wherein the selected production station is configured to receive the selected medical image data and the related medical image data to produce a data storage medium that has recorded on it the selected and the related medical image data, the selected medical image data being recorded on the data storage medium in the standard medical imaging format, and

an audit module configured to automatically provide an auditable trail of the selected medical image data;

a viewing program for the standard medical imaging format that is recorded on the data storage medium, and that is configured to allow viewing of medical image data stored on the data storage medium on widely accessible computers not specifically configured with standard medical imaging software for viewing of medical images; and

a label automatically printed and applied to the data storage medium at the production station, the label containing the identifying information.

2. The system of claim **1**, wherein the data storage medium is an optical disk.

3. The system of claim **1**, wherein the auditable trail of the selected medical image data includes a record of when the selected medical image data and the related medical image data were recorded onto the data storage medium.

4. The system of claim **1**, wherein the medical image server is configured to provide medical image data to the application server in response to generation of medical image data by an imaging modality coupled to the medical image server.

5. The system of claim **4**, wherein the imaging modality is an image scanner configured to generate medical image data in a DICOM-compatible format from a film.

6. The system of claim **1**, wherein the application server further comprises a user authentication module configured to authenticate a user's identification before the user is allowed to access the selection module.

7. The system of claim **1**, wherein the application server further includes a database configured to store medical image data received from the medical image server.

8. The system of claim **7**, wherein the selection module is further configured to provide the user with a listing of patients having medical image data stored in the database.

9. A system comprising:

a medical image server configured to receive medical image data that is generated by a plurality of imaging modalities, the medical image data being formatted in a standard medical imaging format used by specialized computers configured for viewing medical images;

a database configured to store medical image data generated by the plurality of imaging modalities;

a plurality of browsing terminals configured to receive a user selection that defines selected medical image data;

a search module configured to search the database for related medical image data that is related to the selected medical image data; and

a production station that is configured to record all of the following onto a data storage medium:

the selected medical image data, recorded in the standard medical imaging format,

the related medical image data, recorded in the standard medical imaging format, and

a viewing program that is configured to allow viewing of the selected and the related medical image data that is recorded onto the data storage medium on widely accessible computers not specifically configured with standard medical imaging software for viewing of medical images.

10. The system of claim 9, further comprising a configuration data module configured to allow a user to input identifying information relating to the selected medical image data.

11. The system of claim 10, wherein the production station is further configured to print and apply a label to the data storage medium, the label containing the identifying information.

12. The system of claim 9, further comprising an audit module that is configured to automatically provide an auditable trail of the selected medical image data.

13. The system of claim 12, wherein the auditable trail of the selected medical image data includes a record of when the selected medial image data and the related medical image data were recorded onto the data storage medium.

14. The system of claim 12, wherein the auditable trail of the selected medical image data includes identifying information corresponding to the production station used to record the selected medial image data and the related medical image data onto the data storage medium.

15. The system of claim 9, wherein the data storage medium is an optical disk.

16. A method for selecting and automatically recording medical image data onto a data storage medium, the method comprising:

receiving medical image data from a plurality of imaging modalities, the received medical image data being formatted in a standard medical imaging format used by specialized computers configured for viewing medical images;

storing the received medical image data in a database;

providing a user interface configured to receive a user selection that defines selected medical image data;

searching the database for related medical image data that is related to the selected medical image data;

recording the selected medical image data and the related medical image data onto a data storage medium using a production station, the selected medical image data being recorded on the data storage medium in the standard medical imaging format;

recording a viewing program onto the data storage medium using the production station, the viewing program being configured to allow viewing of medical image data stored on the data storage medium on widely accessible computers not specifically configured with standard medical imaging software for viewing of medical images;

printing a label using the production station, wherein the label includes identifying information associated with the selected medical image data; and

affixing the label to the data storage medium using the production station.

17. The method of claim 16, further comprising generating an auditable trail of the selected medical image data, wherein the auditable trail includes a record of when the selected medial image data and the related medical image data were recorded onto the data storage medium.

18. The method of claim 16, wherein the user interface is further configured to collect the identifying information from the user.

19. The method of claim 16, further comprising providing, via the user interface, a list of patients having medical image data stored in the database.

20. The method of claim 16, wherein the plurality of imaging modalities includes an image scanner configured to generate medical image data in a DICOM-compatible format from a film.

21. The method of claim 16, wherein the data storage medium is an optical disk.

22. The method of claim 16, wherein recording the selected medical image data and the related medical image data further comprising selecting a selected production station from a plurality of production stations that are connected to the database via a computer network.

23. A system comprising:

an application server configured to receive medical image data from a medical image server, wherein the medical image data is received in a standard medical imaging format used by specialized computers configured for viewing medical images;

a plurality of production stations;

a plurality of browsing terminals; and

a network connecting the application server, the plurality of production stations and the plurality of browsing terminals;

wherein the application server comprises:

a selection module configured to allow a user to select selected medical image data via a user interface,

a search module configured to search the medical image server for related medical image data that is related to the selected medical image data, and

a production station selection module configured to allow a user to select one of the plurality of production stations, wherein the selected production station is configured to (a) receive the selected medical image data and the related medical image data, (b) produce a data storage medium that has recorded thereon in the standard medical imaging format the selected medical image data and the related medical image data, and (c) also record onto the data storage medium a viewing program for the standard medical imaging format that is configured to allow viewing of the selected medical image data and the related medical image data on widely accessible computers with standard medical imaging software for viewing medical images.

24. The system of claim 23, wherein the selection module is configured to allow the user to select selected medical image data using a selected one of the plurality of production stations or a selected one of the plurality of browsing terminals.

25. The system of claim 23, wherein the application server further comprises a configuration data module configured to allow the user to input identifying information relating to the selected medical imaging data.

26. The system of claim 25, further comprising a label applied to the data storage medium, the label containing the identifying information.

27. The system of claim 23, wherein the application server further comprises an audit module configured to provide an auditable trail of the selected medical image data.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,302,164 C1
APPLICATION NO. : 90/009347
DATED : January 4, 2011
INVENTOR(S) : Ken Wright et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Column 1, Line 40, in Claim 9, after "portable" insert --*digital*--.

In Column 1, Line 40, in Claim 9, delete "medium" and insert --[medium] *device that is removable from the production station*--.

In Column 1, Line 47, in Claim 9, delete "medium" and insert -- [medium] *device*--.

In Column 1, Line 67, in Claim 15, delete ":" and insert -- *;* --.

In Column 2, Line 27, in Claim 16, delete "portable" and insert --*portable, digital*--.

In Column 2, Line 28, in Claim 16, delete "medium" and insert --[medium] *device*--.

In Column 2, Line 30, in Claim 16, delete "medium" and insert --[medium] *device*--.

In Column 2, Line 32, in Claim 16, delete "medium" and insert --[medium] *device*--.

In Column 2, Line 34, in Claim 16, delete "medium" and insert --[medium] *device*--.

In Column 2, Line 40, in Claim 16, after "data;" delete "and" and insert --[and]--.

In Column 2, Line 41, in Claim 16, delete "medium" and insert --[medium] *device*--.

In Column 2, Line 42, in Claim 16, delete "production station." and insert --production station*; removing the data storage device from the production station.*--.

Signed and Sealed this
Nineteenth Day of April, 2011

David J. Kappos

David J. Kappos
Director of the United States Patent and Trademark Office

US007302164C1

(12) EX PARTE REEXAMINATION CERTIFICATE (7967th)

United States Patent

Wright et al.

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(45) Certificate Issued: Jan. 4, 2011

(54) **SYSTEM AND METHOD FOR PRODUCING MEDICAL IMAGE DATA ONTO PORTABLE DIGITAL RECORDING MEDIA**

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(51) **Int. Cl.**
H04N 5/91 (2006.01)

(52) **U.S. Cl.** **386/95**; 386/112; 386/126

(58) **Field of Classification Search** ..... None
See application file for complete search history.

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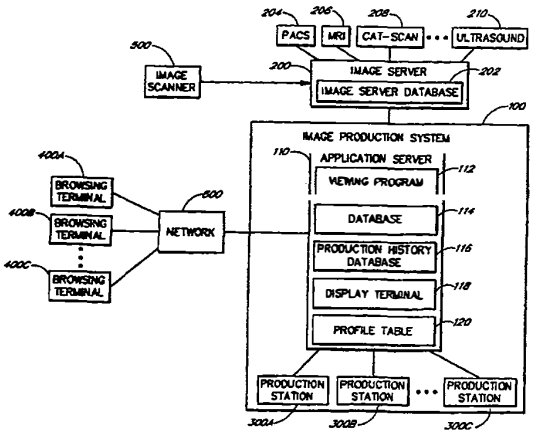
Primary Examiner—Sam Rimell

(57) **ABSTRACT**

This application discloses a system for recording medical image data for production on a portable digital recording medium such as CDs and DVDs. This system includes a receiving module, a processing module and an output module, with viewing program for viewing medical image data stored on the portable digital recording medium. It also discloses a method of storing medical image data on a portable digital recording medium, including the steps of receiving the medical image data, processing the data and storing the data on the portable digital recording medium, with a viewing program for viewing medical image data stored on the portable digital recording medium. It further discloses a method of selecting medical image data for recording on a portable digital recording medium, including the steps of connecting a browsing terminal to a computer database that stores the medical image data, selecting a first set of the medical image data from the computer database, and recording the selected first set of medical image data on the portable digital medium, with a viewing program for viewing the medical image data stored on the portable digital recording medium. It also discloses the method and system of retrieving medical image data that are related to the received/selected original medical image data, and recording the original and related medical image data on a portable digital recording medium.



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EX PARTE REEXAMINATION CERTIFICATE ISSUED UNDER 35 U.S.C. 307

THE PATENT IS HEREBY AMENDED AS INDICATED BELOW.

Matter enclosed in heavy brackets [ ] appeared in the patent, but has been deleted and is no longer a part of the patent; matter printed in italics indicates additions made to the patent.

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **9, 15, 16** and **21** are determined to be patentable as amended.

Claims **10-14, 17-20** and **22**, dependent on an amended claim, are determined to be patentable.

Claims **1-8** and **23-27** were not reexamined.

9. A system comprising:

a medical image server configured to receive medical image data that is generated by a plurality of imaging modalities, the medical image data being formatted in a standard medical imaging format used by specialized computers configured for viewing medical images;

a database configured to store medical image data generated by the plurality of imaging modalities;

a plurality of browsing terminals configured to receive a user selection that defines selected medical image data;

a search module configured to search the database for related medical image data that is related to the selected medical image data; and

a production station that is configured to record all of the following onto a *single, portable* data storage medium:

the selected medical image data, recorded in the standard medical imaging format,

the related medical image data, recorded in the standard medical imaging format, and

a viewing program that is configured to allow viewing of the selected and the related medical image data that is recorded onto the data storage medium on widely accessible computers not specifically configured with standard medical imaging software for viewing of medical images.

15. [The system of claim **9**,] *A system comprising:*

a medical image server configured to receive medical image data that is generated by a plurality of imaging modalities, the medical image data being formatted in a standard medical imaging format used by specialized computers configured for viewing medical images;

a database configured to store medical image data generated by the plurality of imaging modalities;

a plurality of browsing terminals configured to receive a user selection that defines selected medical image data;

a search module configured to search the database for related medical image data that is related to the selected medical image data; and

a production station that is configured to record all of the following onto a data storage medium, wherein the data storage medium is an optical disk[.] *:*

the selected medical image data, recorded in the standard medical imaging format,

the related medical image data, recorded in the standard medical imaging format, and

a viewing program that is configured to allow viewing of the selected and the related medical image data that is recorded onto the data storage medium on widely accessible computers not specifically configured with standard medical imaging software for viewing of medical images.

16. A method for selecting and automatically recording medical image data onto a data storage medium, the method comprising:

receiving medical image data from a plurality of imaging modalities, the received medical image data being formatted in a standard medical imaging format used by specialized computers configured for viewing medical images;

storing the received medical image data in a database;

providing a user interface configured to receive a user selection that defines selected medical image data;

searching the database for related medical image data that is related to the selected medical image data;

recording the selected medical image data and the related medical image data onto a *single, portable* data storage medium using a production station, the selected medical image data being recorded on the data storage medium in the standard medical imaging format;

recording a viewing program onto the data storage medium using the production station, the viewing program being configured to allow viewing of medical image data stored on the data storage medium on widely accessible computers not specifically configured with standard medical imaging software for viewing of medical images;

printing a label using the production station, wherein the label includes identifying information associated with the selected medical image data; and

affixing the label to the data storage medium using the production station.

21. [The method of claim **16**,] *A method for selecting and automatically recording medical image data onto a data storage medium, the method comprising:*

receiving medical image data from a plurality of imaging modalities, the received medical image data being formatted in a standard medical imaging format used by specialized computers configured for viewing medical images;

storing the received medical image data in a database;

providing a user interface configured to receive a user selection that defines selected medical image data;

searching the database for related medical image data that is related to the selected medical image data;

recording the selected medical image data and the related medical image data onto a data storage medium using a production station, wherein the data storage medium is an optical disk[.] *the selected medical image data being recorded on the data storage medium in the standard medical imaging format;*

recording a viewing program onto the data storage medium using the production station, the viewing program being configured to allow viewing of medical image data stored on the data storage medium on widely accessible computers not specifically configured

with standard medical imaging software for viewing of medical images;

printing a label using the production station, wherein the label includes identifying information associated with the selected medical image data; and

affixing the label to the data storage medium using the production station.

* * * * *

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U.S. PATENT: *7,729,597*
ISSUE DATE: *June 01, 2010*

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Under Secretary of Commerce for Intellectual Property
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P. SWAIN
Certifying Officer

(12) **United States Patent**
Wright et al.

(10) **Patent No.: US 7,729,597 B2**
(45) **Date of Patent: *Jun. 1, 2010**

(54) **SYSTEM AND METHOD FOR PRODUCING MEDICAL IMAGE DATA ONTO PORTABLE DIGITAL RECORDING MEDIA**

(75) Inventors: **Ken Wright**, Chino Hills, CA (US); **Chet LaGuardia**, Rancho Santa Margarita, CA (US)

(73) Assignee: **Datcard Systems, Inc.**, Irvine, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **12/491,187**

(22) Filed: **Jun. 24, 2009**

(65) **Prior Publication Data**

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Related U.S. Application Data

(63) Continuation of application No. 11/942,630, filed on Nov. 19, 2007, which is a continuation of application No. 09/761,795, filed on Jan. 17, 2001, now Pat. No. 7,302,164.

(60) Provisional application No. 60/181,985, filed on Feb. 11, 2000.

(51) **Int. Cl.**
H04N 5/91 (2006.01)

(52) **U.S. Cl.** **386/125**; 386/126; 705/2; 705/3

(58) **Field of Classification Search** 386/95, 386/125, 126; 705/2, 3, 5
See application file for complete search history.

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Primary Examiner—Huy T Nguyen
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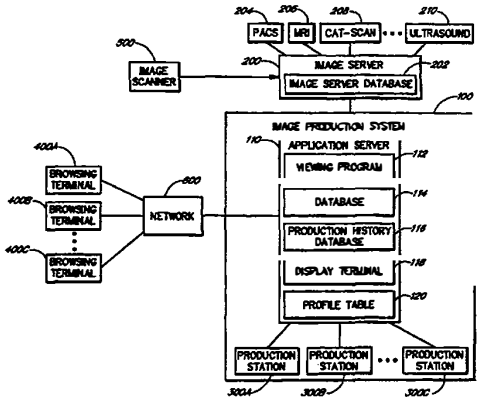
(57) **ABSTRACT**

This application discloses a system for recording medical image data for production on a portable digital recording medium such as CDs and DVDs. This system includes a receiving module, a processing module and an output module, with viewing program for viewing medical image data stored on the portable digital recording medium. It also discloses a method of storing medical image data on a portable digital recording medium, including the steps of receiving the medical image data, processing the data and storing the data on the portable digital recording medium, with a viewing program for viewing medical image data stored on the portable digital recording medium. It further discloses a method of selecting medical image data for recording on a portable digital recording medium, including the steps of connecting a browsing terminal to a computer database that stores the medical image data, selecting a first set of the medical image data from the computer database, and recording the selected first set of medical image data on the portable digital medium, with a viewing program for viewing the medical image data stored on the portable digital recording medium. It also discloses the method and system of retrieving medical image data that are related to the received/selected original medical image data, and recording the original and related medical image data on a portable digital recording medium.

10 Claims, 5 Drawing Sheets



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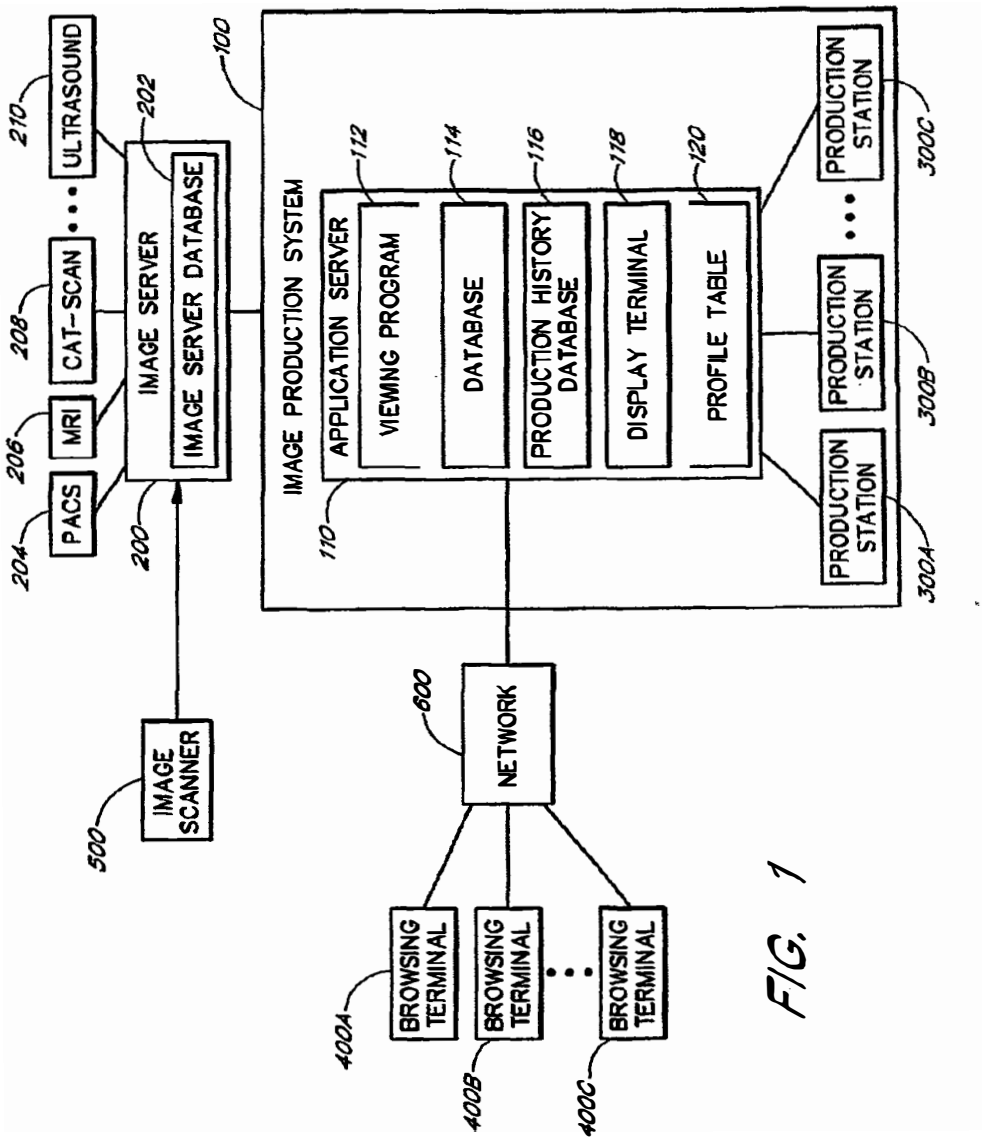


FIG. 1

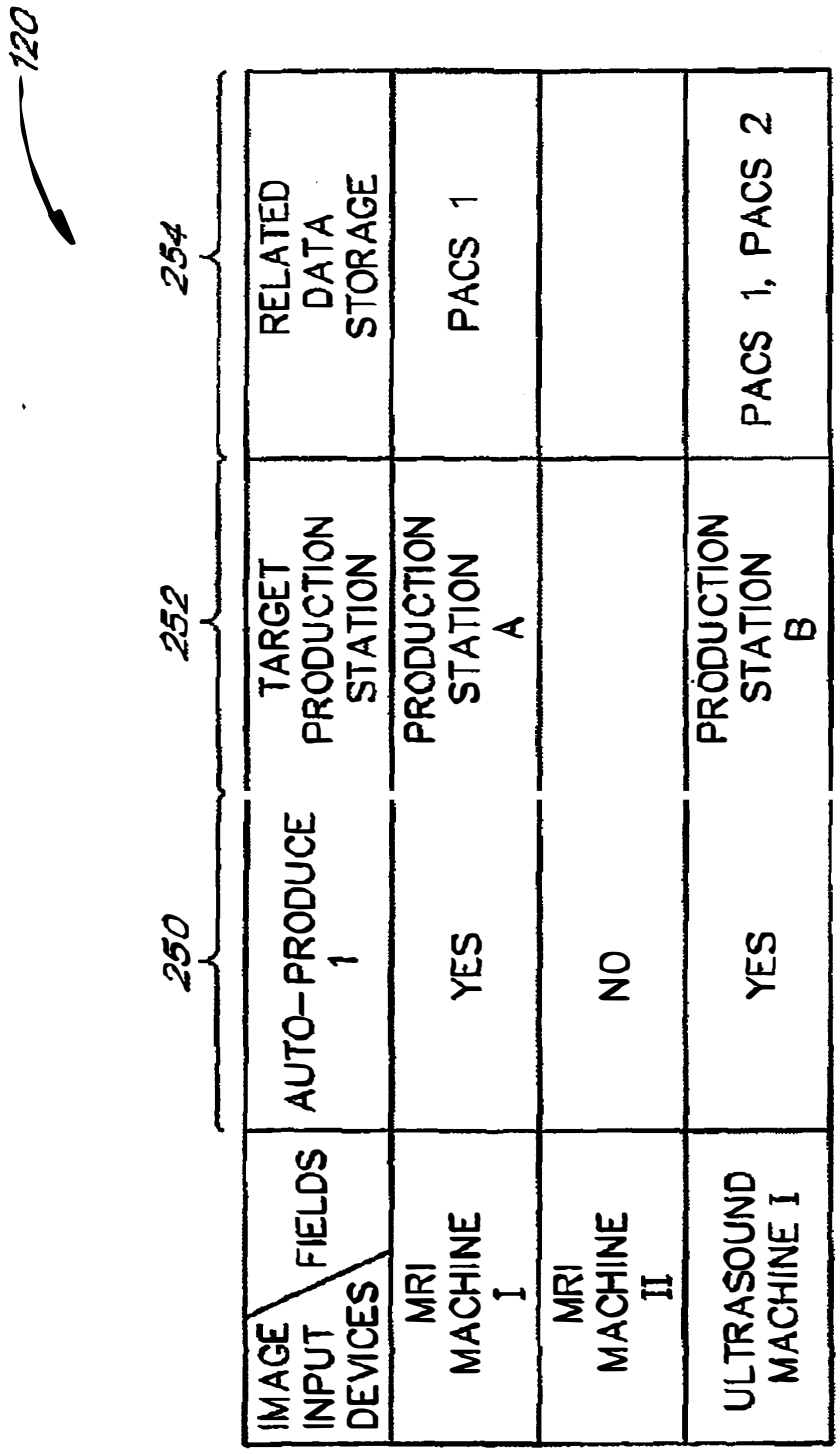
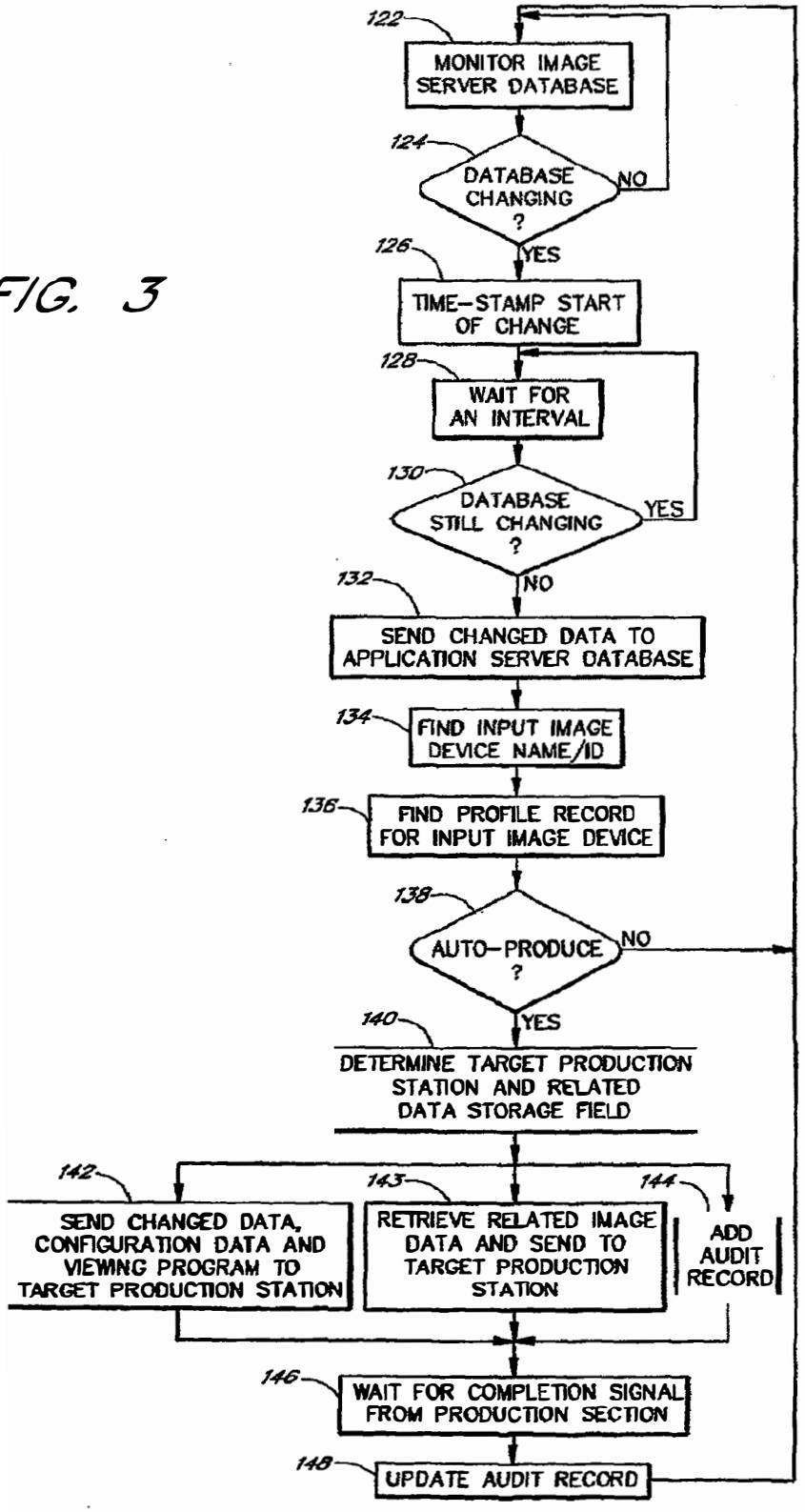


FIG. 2

FIG. 3



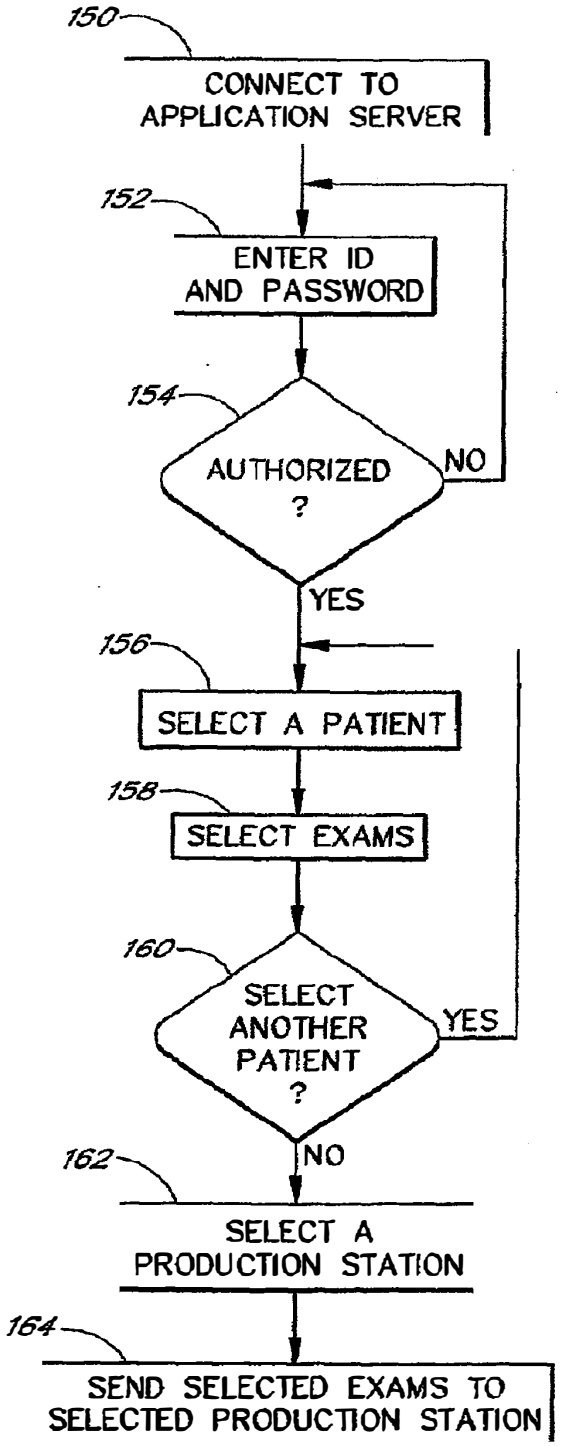


FIG. 4

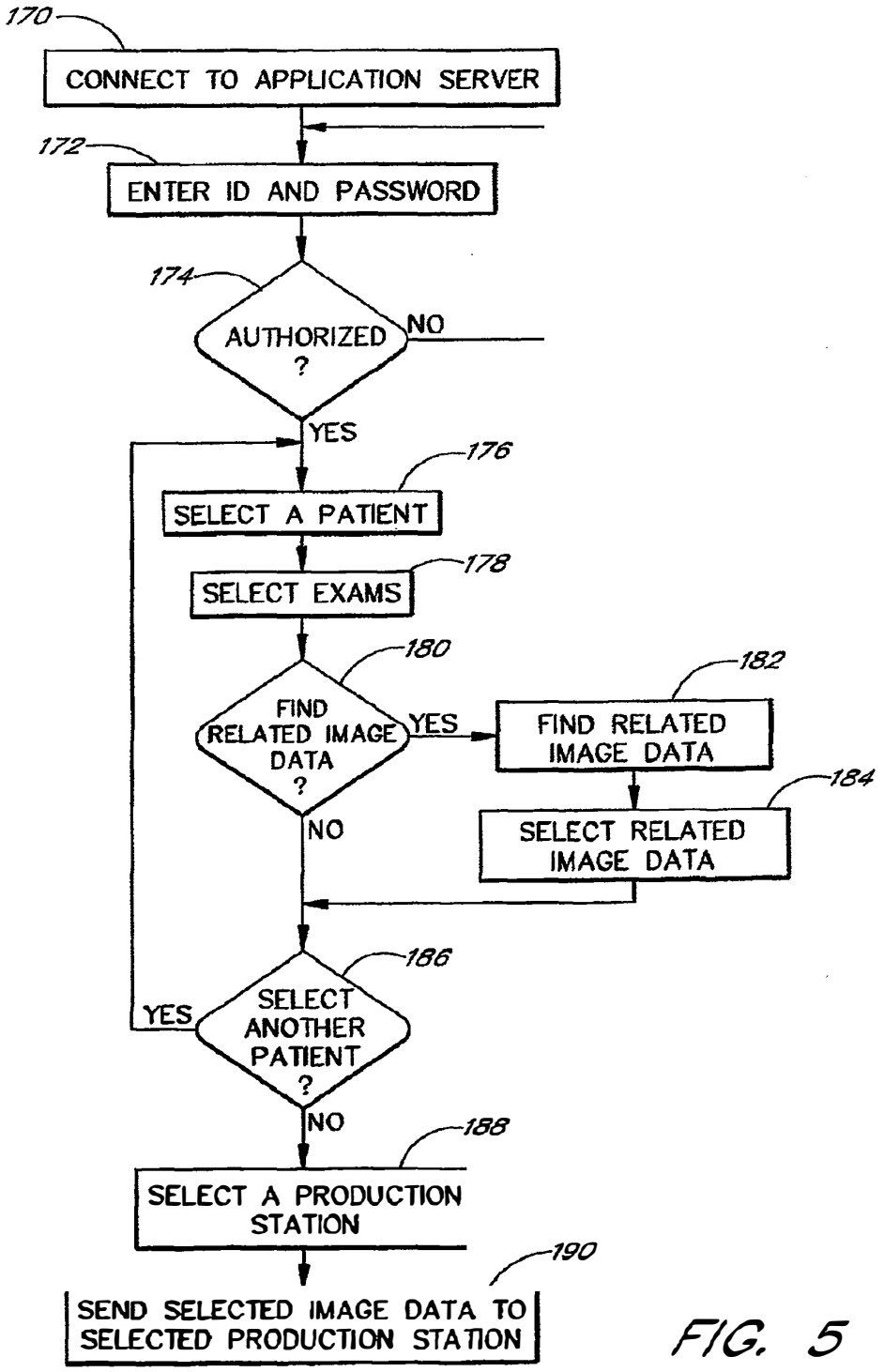


FIG. 5

SYSTEM AND METHOD FOR PRODUCING MEDICAL IMAGE DATA ONTO PORTABLE DIGITAL RECORDING MEDIA

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 11/942,630, filed on Nov. 19, 2007, which is a continuation of U.S. patent application Ser. No. 09/761,795, filed on Jan. 17, 2001, now U.S. Pat. No. 7,302,164, issued Nov. 27, 2007, and claims priority to U.S. Provisional Patent Application 60/181,985, filed on Feb. 11, 2000. The entire disclosure of these priority applications are hereby incorporated by reference herein in their entirety.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a system and method for the production of medical image data on portable digital recording media such as compact discs. More particularly, it relates to a system and method for receiving medical image data, processing medical image data, and transmitting medical image data to be recorded on a portable digital recording medium.

2. Description of the Related Art

Since the invention of the x-ray film, film has been the predominant multipurpose medium for the acquisition, storage, and distribution of medical images. However, the storage and distribution of film often requires considerable expenses in labor and storage space.

Today's modern hospitals utilize computer-aided imaging devices such as Computed Tomography (CT), Digital Subtracted Angiography, and Magnetic Resonance Imaging (MRI). These digital devices can generate hundreds of images in a matter of seconds. Many hospitals require these images to be printed on film for storage and distribution. To print complete sets of medical images from these digital devices, the cost in film material, storage space, and management efforts is often very high.

Some radiology departments have installed digital image storage and management systems known as PACS (Picture Archive Communication Systems). PACS are capable of storing a large amount of medical image data in digital form. PACS are made by manufacturers including GE, Siemens, and Fuji.

To ease the communication of data, the DICOM (Digital Imaging and Communications in Medicine) standard was developed by ACR-NEMA (American College of Radiology-National Electrical Manufacturer's Association) for communication between medical imaging devices and PACS. In addition to the examined images, patient demographics, and exam information such as patient name, patient age, exam number, exam modality, exam machine name, and exam date can also be stored and retrieved in DICOM compatible data format. A DICOM file stores patient and exam information in the header of the file, followed by the exam images. PACS store medical image data in DICOM format.

Digital medical image data can be stored on PACS and distributed using the Internet. However, many physicians' offices do not have the bandwidth suitable for fast download of medical image data. The concerns for medical data privacy and Internet security further reduce the desirability of Internet distribution.

SUMMARY OF THE INVENTION

The claimed system allows for digital medical image data to be produced on a portable digital recording medium such as a CD. A CD containing the medical image data can be distributed to physicians, hospitals, patients, insurance companies, etc. One embodiment of the claimed system allows for medical image data to be placed on a CD along with a viewing program, so that a user can use any computer compatible with the CD to view the medical image data on the CD. One embodiment of the claimed system allows for searching medical exam data that are related and placing such data on the same CD.

One embodiment of the claimed system comprises a receiving module configured to receive medical image data, a processing module configured to process the received medical image data, and an output module configured to transmit the processed medical image data to a production station configured to produce the transmitted medical image data on portable digital recording medium, such as a CD. In one embodiment, the output module transmits a viewing program configured to view medical image data to the production station so that the viewing program is produced on the same CD as the medical image data. In another embodiment, the CD already contains the viewing program before the medical image data is transmitted to the CD production station.

In one embodiment of the claimed system, the processing module is configured to create and store audit information of the portable digital recording medium produced by the production station.

In another embodiment of the claimed system, the processing module is configured to identify the originating image input device of the received medical image data, and determine, on the basis of the originating image input device, whether to transmit the received medical image data to a production station. The processing module also selects, on the basis of the originating image input device, one of multiple production stations as the target production station.

Yet another embodiment of the claimed system is configured to retrieve medical image data that are related to the received medical image data, and transmit the retrieved related image data to the production station. In one embodiment, exam images of the same patient are considered related. In another embodiment, exam images of the same patient and the same modality are considered related. For example, two x-ray exams on the left hand of the same patient are considered related. In yet another embodiment, exam images of the same patient, the same modality and taken within a specified date range are considered related. For example, two x-ray exams on the left hand of the same patient taken within a two-month period are considered related. A hospital may also determine other scenarios of relatedness.

One claimed method comprises the steps of connecting a browsing terminal to a computer database configured to store medical image data, selecting medical image data from medical image data stored on the database, and recording the selected medical image data on portable digital recording medium. In one embodiment, the claimed method also comprises a step of recording a viewing program configured to view medical image data on the portable digital recording medium.

One embodiment of the claimed method further comprises the steps of finding and retrieving medical image data that are

related to the selected medical image data, and recording related image data to portable digital recording medium.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates one embodiment of an image production system comprising an application server and portable digital recording medium production stations.

FIG. **2** illustrates sample records of one embodiment of an image input device profile table.

FIG. **3** illustrates a process of receiving image data from image server, processing received image data, and transmitting such data to the production station. This process also retrieves and transmits related image data for production.

FIG. **4** illustrates a process of a user selecting and ordering the production of image data stored on the application server.

FIG. **5** illustrates a process of a user selecting and ordering the production of image data stored on the application server, with the option of selecting and ordering the production of related image data.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** illustrates one embodiment of an image production system **100** comprising an application server **110** and one or more portable digital recording medium production stations **300**A, **300**B and **300**C. In the preferred embodiment, the production stations **300**A, **300**B and **300**C are CD (Compact Disc) production stations. Digital portable recording medium comprises CDs and DVDs (Digital Versatile Disc or Digital Video Disc). CDs may comprise CD-ROM (Compact Disc Read Only Memory), CD-R (Compact Disc Recordable), and CD-RW (Compact Disc Recordable and Writable). DVDs may comprise DVD-ROM (DVD Read Only Memory), DVD-R (DVD Recordable) and DVD-RAM (a standard for DVDs that can be read and written many times). Thus, although the following description refers primarily to CDs, those of ordinary skill in the art will understand that any suitable portable digital recording medium can be substituted for CDs.

The application server **110** is connected to one or more physician browsing terminals **400**A, **400**B and **400**C through a computer network **600**. Each physician browsing terminal **400**A, **400**B or **400**C comprises a browsing program such as Internet Explorer or Netscape Communicator. Physicians or their assistants launch the browsing program to access the application server **110** through the network **600** in order to select medical image data stored on the application server database **114** to be produced by a production station **300**A, **300**B or **300**C. In the preferred embodiment, the physician browsing terminals **400**A, **400**B and **400**C are connected to the application server through an Intranet. One embodiment of the Intranet utilizes TCP/IP network protocol. The Intranet can connect one radiology department, multiple departments within a hospital, or multiple hospitals. In another embodiment the browsing terminals **400**A, **400**B and **400**C are connected to the application server **110** through the Internet.

Still referring to FIG. **1**, the application server **110** is also connected to an image server **200**. The image server **200** is further connected to image input devices such as PACS **204**, MRI machines **206**, CT-scan machines **208**, ultrasound machines **210**, etc. In the preferred embodiment, the image server **200** is a DICOM image server configured to receive and store medical image data in DICOM format. In operation, the image server **200** receives medical image data from image input devices such as PACS **204**, MRI machines **206**, CT-scan machines **208** and ultrasound machines **210** and stores such image data in the image server database **202**. A high-resolution image scanner **500** is also connected to the image server **200**, so that medical image data stored on film can be scanned on the image scanner **500**, transmitted to the image server **200** and stored in the image server database **202**. In one embodiment, the image scanner **500** also converts the scanned image to DICOM format. The application server **110** receives input image data from the image server database **202**, processes the received image data, and sends the image data to one of the production stations **300**A, **300**B or **300**C to produce CDs.

The application server **110** comprises a viewing program **112**, an application server database **114** that stores image data received from the image server **200**, a production history database **116** that stores audit records on each CD produced, a display terminal **118** for programming and operating the application server **110** by a programmer or physician, and an image input device profile table **120**.

Still referring to FIG. **1**, the viewing program **112** is configured to allow users to read and manipulate medical image data. The viewing program **112** comprises multiple image manipulation functions, such as rotating images, zooming in and zooming out, measuring the distance between two points, etc. The viewing program **112** also allows users to read the patient demographics and exam information associated with the image data. The viewing program **112** used in the preferred embodiment is produced by eFilm Medical Inc. located in Toronto, Canada. The viewing program **112** used in the preferred embodiment is an abbreviated version with fewer functions and takes less storage space, in order to maximize the storage space for image data on a CD. The image server **200** used in the preferred embodiment is also made by eFilm Medical Inc.

The CD production stations **300**A, **300**B and **300**C in the preferred embodiment are produced by Rimage Corporation in Edina, Minn. Details about the Rimage CD production stations can be found in U.S. Pat. Nos. 5,542,768, 5,734,629, 5,914,918, 5,946,276, and 6,041,703, which are incorporated herein by reference in their entirety.

The application server **110** in the preferred embodiment runs on a personal computer running a 400 MHz Celeron or Pentium II/III chip, with Windows 98 or NT as the operating system.

FIG. **2** illustrates sample records of one embodiment of an image input device profile table **120**. The image input device profile table **120** contains a profile record for each image input device. Each image input device's profile record comprises: (1) an "auto-produce" logical field **250** indicating whether medical image data from this image input device should be produced on CD automatically by the image production system **100**, (2) a "target production station" field **252** identifying one of the production stations **300**A, **300**B or **300**C on which medical image data is to be produced, and (3) a "related data storage" **254** field identifying the medical image data storage units in which to search for the related image data. A medical image data storage unit is a storage unit that stores medical image data and is connected to the application server **110**. In one embodiment, a medical image data storage unit is connected to the application server **110** through the image server **200**. In the preferred embodiment, PACS **204** is such a medical image data storage unit.

In FIG. **2**, the sample profile table **120** contains profile records for MRI Machine I, MRI Machine II, and Ultrasound Machine I. For MRI Machine I, the "auto-produce" field **250** contains a "yes" value, directing the image production system **100** to automatically produce image data originating from MRI Machine I on portable digital recording medium. Its

"target production station" field **252** contains a "Production Station A" value, directing the image production system **100** to produce image data originating from MRI Machine I on production station A. Its "related data storage" field **254** is "PACS I", directing the image production system **100** to retrieve related medical image data from PACS I. For MRI Machine II, the "auto-produce" field **250** is "no", directing the image production system **100** to not automatically produce image data originating from MRI Machine II on portable digital recording medium. Since image data from MRI Machine II will not be automatically produced, the "target production station" field **252** and the "related data storage" field **254** are irrelevant. For Ultrasound Machine I, the "auto-produce" field **250** is "yes", and its "target production" filed **252** is "Production Station B". Its "related data storage" field **254** contains a value of "PACS I, PACS II", directing the image production system **100** to search PACS I and PACS II for related medical image data.

FIG. **3** illustrates a process of the application server **110** receiving image data from the image server **200**, processing the received image data, and transmitting such data to the production station **300**A, **300**B or **300**C. The application server **110** continuously monitors the image server database **202** in step **122**. In one embodiment, the application server continuously "pings" the network address corresponding to the image server **200** on the network that connects the application server **110** with the image server **200**.

Still referring to FIG. **3**, the application server **110** determines if the image server database **202** is changing, in step **124**. In the preferred embodiment, the application server **110** makes that determination by detecting whether the image server database **202** is increasing in size. If there is no change in the image server database **202**, then the application server **110** returns to step **122** to continue monitoring. If there is change in the image server database **202**, then the application server **110** proceeds to step **126** and time-stamps the moment that the change started. The application server **110** then proceeds to step **128** and waits for an interval, typically 35 to 65 seconds. After the interval, the application server **110** checks whether the image server database **202** is still changing, in step **130**. If the image server database **202** is still changing then the application server **110** returns to step **128** to wait for another interval. If the image server database **202** is no longer changing, then the application server **110** proceeds to step **132** and copies the data changed since the time-stamped moment. This changed data is copied from the image server database **202** to the application server database **114**.

The application server **110** proceeds to step **134** and finds the input image device name or identification number from the newly received image data. In the preferred embodiment, image data from the image server database **202** are stored in DICOM format, and the input image device name or identification number is stored in the header of the DICOM format image data file. The input image device name/ID indicates the origin of the newly received data. The application server **110** proceeds to step **136** and uses the found input image device name/ID to find a corresponding profile record in the image input device profile table **120**. If the profile record has an "auto-produce" field **250** with a "no" value, the application server **110** returns from step **138** to step **122** to continue monitoring the image server database **202**. If the "auto-produce" field **250** contains a "yes" value, the application server **110** proceeds from step **138** to step **140**, and determines the target production station **300**A, **300**B or **300**C from the "target production station" field **252** of the profile record. In step **140**, the application server **110** also determines the value in the "related data storage" field **254** of the profile record.

Still referring to FIG. **3**, in step **142**, the application server **110** sends a copy of the newly received data, along with a copy of the viewing program **112**, to the target production station **300**A, **300**B or **300**C identified in step **140**. With the viewing program attached, the image data on each CD produced by the target production station **300**A, **300**B or **300**C can be viewed on any computer that accepts the CD, regardless of whether that computer has its own viewing program installed. In one embodiment, the data received in step **132** is stored in the application server database **114** before it is transmitted to the target production station **300**A, **300**B or **300**C in step **142**. In another embodiment, the application server **110** transmits the data received in step **132** to the target production station **300**A, **300**B or **300**C, without storing a copy of the data in the application server database **114**.

In one embodiment, the application server **110** does not send a copy of the viewing program **112** to the target production station during step **142**. Rather, the application server **110** sends a copy of the received medical image data to the production station **300**A, **300**B or **300**C to be recorded on pre-burned CDs. Each pre-burned CD contains a viewing program already recorded onto the CD before step **142**.

In step **142**, the application server **110** also sends configuration data to the target production station **300**A, **300**B or **300**C. The configuration data comprises a label-printing file comprising the specification for printing labels on top of the CDs, and a "number of copies" value indicating the number of copies of CDs to be produced. A typical specification in the label-printing file may specify information such as patient name, exam modality, hospital name, physician name, production date, etc. to be printed by the target production station as a label on the top of each CD produced.

Still referring to FIG. **3**, in step **143**, the application server **110** searches the application server database **114** for image data related to the newly received data. The application server **110** then searches the PACS systems identified in the "related data storage" field **254** in step **140** for data related to the newly received data. Some PACS systems each comprise a primary image data storage and an archive image data storage, and the application server **110** searches both the primary image data storage and the archive image data storage on these PACS systems. The application server **110** is connected to the PACS systems through the image server **200**. The application server **110** retrieves found related data from the PACS systems and stores a copy of such found related data in the application server database **114**. The application server **110** sends a copy of related data that are found from the application server database **114** or the PACS systems to the target production station **300**A, **300**B or **300**C. The medical image data originally received in step **132** and the related medical image data are produced by the target production station **300**A, **300**B or **300**C on the same CDs for comparative study.

For each CD to be produced, the application server **110** adds one audit record to the production history database **116** in step **144**. The new audit record comprises the identification number of the CD and other relevant information about the CD, such as the physician who requested the production (if any), and the names of the patients whose exam images are on that CD.

Steps **142**, **143** and **144** may be executed immediately before, concurrent with, or immediately after one another.

The target production station **300**A, **300**B or **300**C produces the CDs containing the medical image data and the viewing program sent to it, and prints a label on top of every CD, corresponding to the specification in the label-printing file. The number of CDs produced corresponds to the "number of copies" number sent by the application server **110** in

step **142**. When the target production station has produced the CDs, the production station returns a "completed" signal to the application server **110**. The application server **110** waits for this signal in step **146**.

Still referring to FIG. **3**, in step **148**, the application server **110** updates the audit records in the production history database **116** that were created in step **144**. For each CD produced, the application **110** server updates the date and time of production for that CD's audit record. The application server **110** also updates the status value for that CD's audit storage record from "processing" to "successful". The application server **110** then continues monitoring the image server database **202** as in step **122**.

FIG. **4** illustrates a process of a user selecting and ordering the production of image data stored on the application server **110**. A user, typically a physician or physician's assistant, accesses the application server database **114** from a browsing terminal **400**A, **400**B or **400**C connected to a network **600**. In one embodiment, the user launches a browser such as Microsoft Internet Explorer or Netscape Communicator, and specifies a network address corresponding to the application server **110**, in step **150**. In another embodiment, the user clicks a pre-defined icon that directly launches a browser connecting to the application server **110**. The application server **110** prompts the user to enter a password or an identification name coupled with a password, in step **152**. The application server **110** checks if the entered identification/password is authorized in step **154**. If the entered identification/password is not authorized the user is returned to step **152** to re-enter the identification/password, or disconnected from the application server **110**. If the entered identification/password is authorized then the user is allowed access to the application server database **114** and the application server **110** proceeds to step **156**.

Still referring to FIG. **4**, in step **156** the user is prompted to select a patient from a list of patients with exam images in the application server database **114**. The user is then shown a list of the selected patient's exams, and is prompted to select one or more exams of that patient, in step **158**. When the user indicates that he/she has completed selecting all exams for that patient, the user is asked in step **160** whether to select another patient from the list of patients. If the user answers "yes", the user is returned to step **156** to select another patient. If the user answers "no", the user proceeds to step **162**.

In another embodiment, when a user selects a patient, all exams belonging to that patient will be automatically selected without prompting for user selection. In yet another embodiment, the user is not prompted to select patients, but is only prompted to select exams from a list of all exams for all patients contained in the application server database **114**.

When the user indicates that he/she has completed selecting, the user is prompted to select a production station from a list of production stations **300**A, **300**B and **300**C in step **162**. The user is also prompted to enter additional label text to be printed as labels on the CDs to be produced, to supplement the text printed according to the specification of the label-printing file. The user can advantageously select the production station located closest to his/her office. In one embodiment, only one production station is connected to the application server **110**, and the lone production station will be the selected production station without prompting for user selection.

In one embodiment, the user is also prompted to select the number of copies of CDs to be produced. In another embodiment, the number of copies is set at one without prompting for user direction. As described above in connection with FIG. **3**, in step **164**, the application server **110** sends a copy of the image data of the selected exams for the selected patients to the selected production station, along with a copy of the viewing program **112**, and configuration data comprising a label-printing file, additional label text, and a number indicating the number of copies of CDs to be produced. The production station **300**A, **300**B or **300**C then produces one or more CDs containing the selected exams for the selected patients and the viewing program, with labels printed on top of the CDs according to the specification in the label-printing file and the user-entered additional label text.

In another embodiment, a user accesses the application server database **114** not from a browsing terminal **400**A, **400**B or **400**C, but directly from the display terminal **118**. In this embodiment the user directly proceeds from step **152**. In this embodiment the user is typically a programmer or operator of the image production system **100**.

FIG. **5** illustrates a process of a user selecting and ordering the production of image data stored on the application server **110**, with the additional option of selecting and ordering the production of related data for comparative study. As described above in connection with FIG. **4**, a user connects to the application server **110** from a browsing terminal **400**A, **400**B or **400**C in step **170**. The user enters identification information and a password in step **172**. Step **174** determines whether the user is authorized to access the application server database **114**. If authorized, the user is prompted to select a patient in step **176**, and selects exams of the selected patient in step **178**. The user is then asked in step **180** if he/she desires to find related data of that patient for comparative study.

If the user answers yes, the application server **110** then searches for related data. The application server **110** finds the image input device profile table **120** profile record corresponding to the image input device from which the selected data originates, identifies the list of PACS systems stored in the "related data storage" field **254**, and searches these PACS systems for related data. In another embodiment, once the user has selected a patient/exam combination, the application server **110** automatically searches for related data without asking for user direction. In this embodiment, the application server **110** alerts the user if related data are found. In one embodiment, the application server **110** also searches the application server database **114** for related medial image data.

Still referring to FIG. **5**, the user is then prompted to select all or some of the related data from the list of found related data for production, in step **184**. In another embodiment, all found related data are automatically selected by the application server **110** for production, without prompting for user selection.

The user is then prompted to select another patient in step **186**. After the user has completed selecting all patients, the user is prompted to select a CD production station **300**A, **300**B or **300**C in step **188**. The user is also prompted to enter additional label text. In step **190**, the application server **110** then sends a copy of the original and selected related data, along with a copy of the viewing program **112**, a number indicating the number of copies to be produced, additional label text, and a label-printing file to the selected production station **300**A, **300**B or **300**C for production.

The above paragraphs describe the application server **110** with one database **114** for image data storage. In another embodiment, the application server **110** includes two databases for image data storage: a new data database and a storage data database. The new data database stores only the most recent batch of new data just received from the image server **200**. After the data in the new data database is sent to a production station **300**A, **300**B or **300**C, the application server **110** erases data in the new data database. The storage

data database stores all data that has ever been received from the image server database **202**. In the processes described by FIG. **4** and FIG. **5**, a user selects images for production from the storage data database.

Several modules are described in the specification and the claims. The modules may advantageously be configured to reside on an addressable storage medium and configured to execute on one or more processors. The modules may include, but are not limited to, software or hardware components that perform certain tasks. Thus, a module may include, for example, object-oriented software components, class components, processes methods, functions, attributes, procedures, subroutines, segments of program code, drivers, firmware, microcode, circuitry, data, databases, data structures, tables, arrays, and variables. Modules may be integrated into a smaller number of modules. One module may also be separated into multiple modules.

Although the foregoing has been a description and illustration of specific embodiments of the invention, various modifications and changes can be made thereto by persons skilled in the art, without departing from the scope and spirit of the invention as defined by the following claims.

What is claimed is:

1. A computer-implemented method for automatically generating a portable computer-readable medium containing medical data related to a patient, comprising:

receiving, via computer-implemented interface a request for medical data related to the patient;

automatically searching a first computer database via a first database interface for a first set of medical imaging data related to the patient based on the received request;

automatically retrieving the first set of medical imaging data related to the patient;

automatically searching, based on the received request, a second computer database via a second database interface for additional medical data also related to the patient, wherein the second interface is different from the first interface;

automatically receiving the additional related medical data; and

automatically generating a portable computer-readable medium, at a production station, containing the first set of medical imaging data related to the patient and the additional related medical data, wherein the first set of medical imaging data is formatted in a standard medical imaging format used by a computer configured for viewing the medical imaging data.

2. The method of claim **1**, wherein the second computer database is remote from the first computer database and searching the second computer database via the second interface comprises sending a search request to a remote server coupled to the second computer database.

3. The method of claim **1**, wherein searching for additional medical data related to the patient comprises:

automatically checking an electronic profile table to determine that the second computer database has related medical data; and

searching the second computer database via the second interface for the additional related medical data.

4. The method of claim **1**, wherein searching for additional medical data related to the patient comprises:

automatically checking an electronic profile table to determine that the second computer database has medical data that is also related to the patient; and

searching the second computer database via the second interface using a unique identifier associated with the patient.

5. The method of claim **1**, wherein searching the second computer database comprises determining metadata related to the first set of medical imaging data; and searching the second computer database comprises searching the second computer database via the second interface using the metadata.

6. A system for automatically generating a portable computer-readable medium containing medical data related to a patient, comprising:

a first database configured to store medical data related to the patient;

a second database configured to store medical data related to the patient, the second database being distinct from the first database;

a computer-implemented interface configured to receive a request for medical data related to the patient;

an application server coupled to the first database and the second database, said application server being configured to:

send a search request, based on the received request, via a first interface to the first computer database for a first set of medical imaging data related to the patient;

receive from the first database the first set of medical imaging data related to the patient;

send a search request, based on the received request, via a second interface to the second computer database for additional medical data also related to the patient, wherein the second interface is different from the first interface; and

receive from the second database the additional related medical data; and

a production station configured to

generate a portable computer-readable medium containing the first set of medical imaging data related to the patient and the additional related medical data, wherein the medical imaging data is formatted in a standard medical imaging format used by a computer configured for viewing the medical imaging data.

7. The system of claim **6**, wherein the second computer database is remote from the first computer database and searching the second computer database via the second interface comprises sending a search request to a remote server coupled to the second computer database.

8. The system of claim **6**, wherein the application server is further configured to:

check an electronic profile table to determine that the second computer database has related medical data; and

choose to send a search to the second computer database via the second interface for the additional related medical data.

9. The system of claim **6**, wherein the application server is further configured to:

check an electronic profile table to determine that the second computer database has medical data that is also related to the patient; and

send a search request to the second computer database via the second interface using a unique identifier associated with the patient.

10. The system of claim **6**, wherein the application server is further configured to: determine metadata related to the first set of medical imaging data; and wherein the search sent to the second computer database via the second interface is generated based on the metadata.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,729,597 B2
APPLICATION NO. : 12/491187
DATED : June 1, 2010
INVENTOR(S) : Ken Wright et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title Page, at (Item 56), Page 5, Column 2, Line 27, Under Other Publications, change "Heath" to --Health--.

Title Page, at (Item 56), Page 5, Column 2, Line 34, Under Other Publications, change "all," to --al.--.

Title Page, at (Item 56), Page 6, Column 1, Line 45, Under Other Publications, change "Doman" to --Domain--.

Title Page, at (Item 56), Page 6, Column 2, Line 27, Under Other Publications, change "Joumal" to --Journal--.

Title Page, at (Item 56), Page 7, Column 1, Line 50, Under Other Publications, change "Baffiers," to --Barriers--.

Title Page, at (Item 56), Page 10, Column 2, Line 3, Under Other Publications, change "Desecription" to --Description--.

Title Page, at (Item 56), Page 12, Column 1, Line 14, Under Other Publications, change "Summ'y," to --Summary,--.

Title Page, at (Item 56), Page 15, Column 2, Line 24, Under Other Publications, change "VEDPRO," to --VEPRO,--.

Title Page, at (Item 56), Page 15, Column 2, Line 24, Under Other Publications, change "Advertist" to --Adventist--.

Title Page, at (Item 56), Page 17, Column 2, Line 41, Under Other Publications, change "Mammunome" to --Mammome--.

Title Page, at (Item 56), Page 18, Column 1, Line 33, Under Other Publications, change "and Progranunen" to --und Programmen--.

Signed and Sealed this

Fourteenth Day of December, 2010

David J. Kappos

David J. Kappos
Director of the United States Patent and Trademark Office

CERTIFICATE OF CORRECTION (continued)
U.S. Pat. No. 7,729,597 B2

Title Page, at (Item 56), Page 18, Column 1, Line 34, Under Other Publications, change "Archivierungs-and" to --Archivierungs und--.

At Sheet 3 of 5 (Box No. 146) (FIG. 3), Line 2, Change "SECTION" to --STATION--.

At Column 9, Line 27, In Claim 1, change "interface" to --interface,--.

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United States Patent and Trademark Office

August 25, 2011

THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THIS OFFICE OF:

U.S. PATENT: *7,783,174*

ISSUE DATE: *August 24, 2010*

By Authority of the

Under Secretary of Commerce for Intellectual Property

and Director of the United States Patent and Trademark Office

N. WILLIAMS

Certifying Officer


US007783174B2

(12) **United States Patent**
Wright et al.

(10) **Patent No.: US 7,783,174 B2**
(45) **Date of Patent: *Aug. 24, 2010**

(54) **SYSTEM AND METHOD FOR PRODUCING MEDICAL IMAGE DATA ONTO PORTABLE DIGITAL RECORDING MEDIA**

(75) Inventors: **Ken Wright**, Chino Hills, CA (US); **Chet LaGuardia**, Rancho Santa Margarita, CA (US)

(73) Assignee: **Datcard Systems, Inc.**, Irvine, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **12/484,100**

(22) Filed: **Jun. 12, 2009**

(65) **Prior Publication Data**

US 2009/0245754 A1 Oct. 1, 2009

Related U.S. Application Data

(63) Continuation of application No. 11/942,630, filed on Nov. 19, 2007, which is a continuation of application No. 09/761,795, filed on Jan. 17, 2001, now Pat. No. 7,302,164.

(60) Provisional application No. 60/181,985, filed on Feb. 11, 2000.

(51) **Int. Cl.**
H04N 5/91 (2006.01)

(52) **U.S. Cl.** **386/125**; 386/126

(58) **Field of Classification Search** 386/95, 386/125, 126; 705/2, 3

See application file for complete search history.

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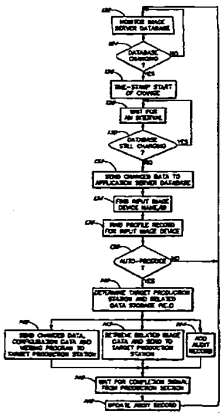
(57) **ABSTRACT**

This application discloses a system for recording medical image data for production on a portable digital recording medium such as CDs and DVDs. This system includes a receiving module, a processing module and an output module, with viewing program for viewing medical image data stored on the portable digital recording medium. It also discloses a method of storing medical image data on a portable digital recording medium, including the steps of receiving the medical image data, processing the data and storing the data on the portable digital recording medium, with a viewing program for viewing medical image data stored on the portable digital recording medium. It further discloses a method of selecting medical image data for recording on a portable digital recording medium, including the steps of connecting a browsing terminal to a computer database that stores the medical image data, selecting a first set of the medical image data from the computer database, and recording the selected first set of medical image data on the portable digital medium, with a viewing program for viewing the medical image data stored on the portable digital recording medium. It also discloses the method and system of retrieving medical image data that are related to the received/selected original medical image data, and recording the original and related medical image data on a portable digital recording medium.

14 Claims, 5 Drawing Sheets



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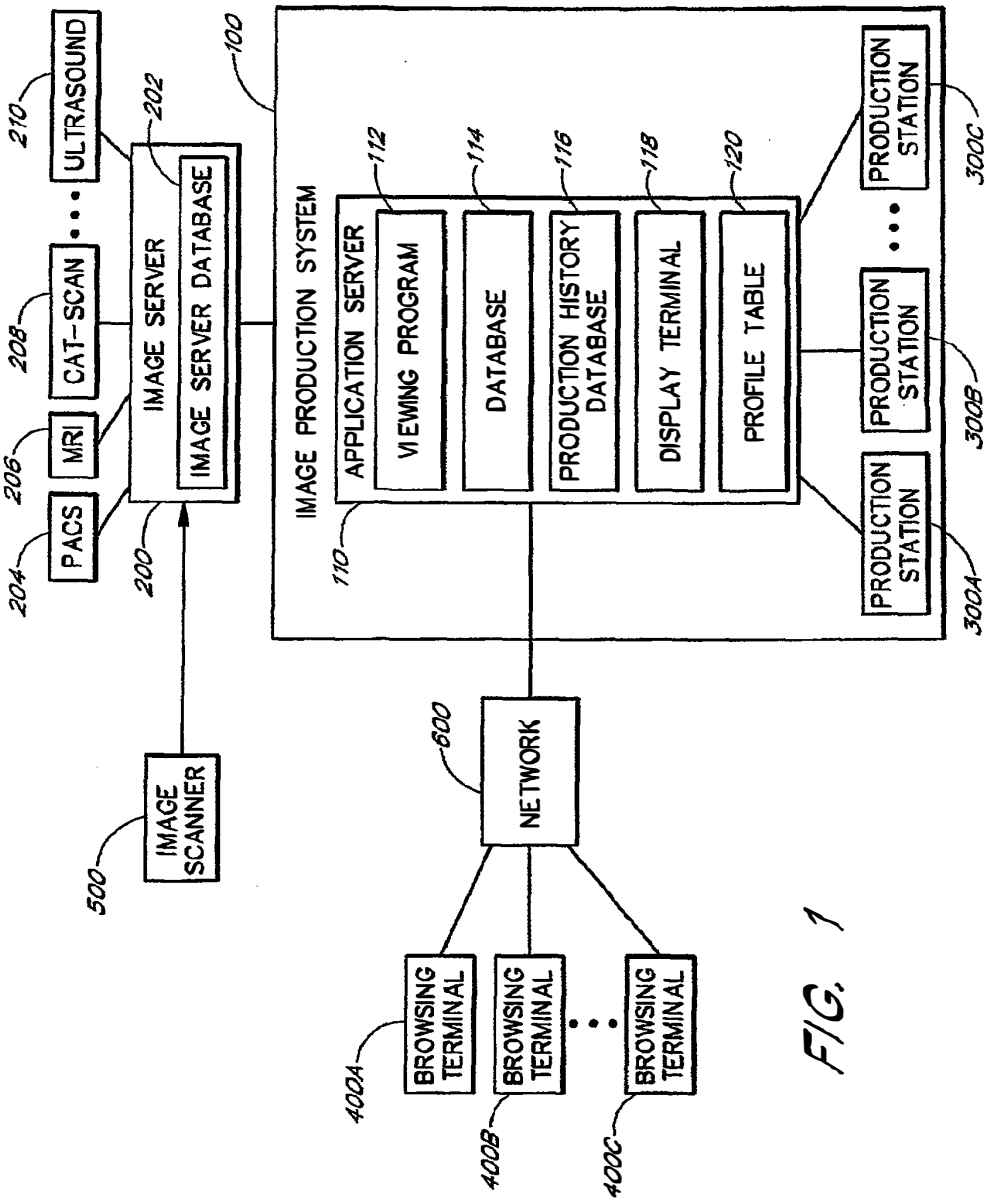


FIG. 1

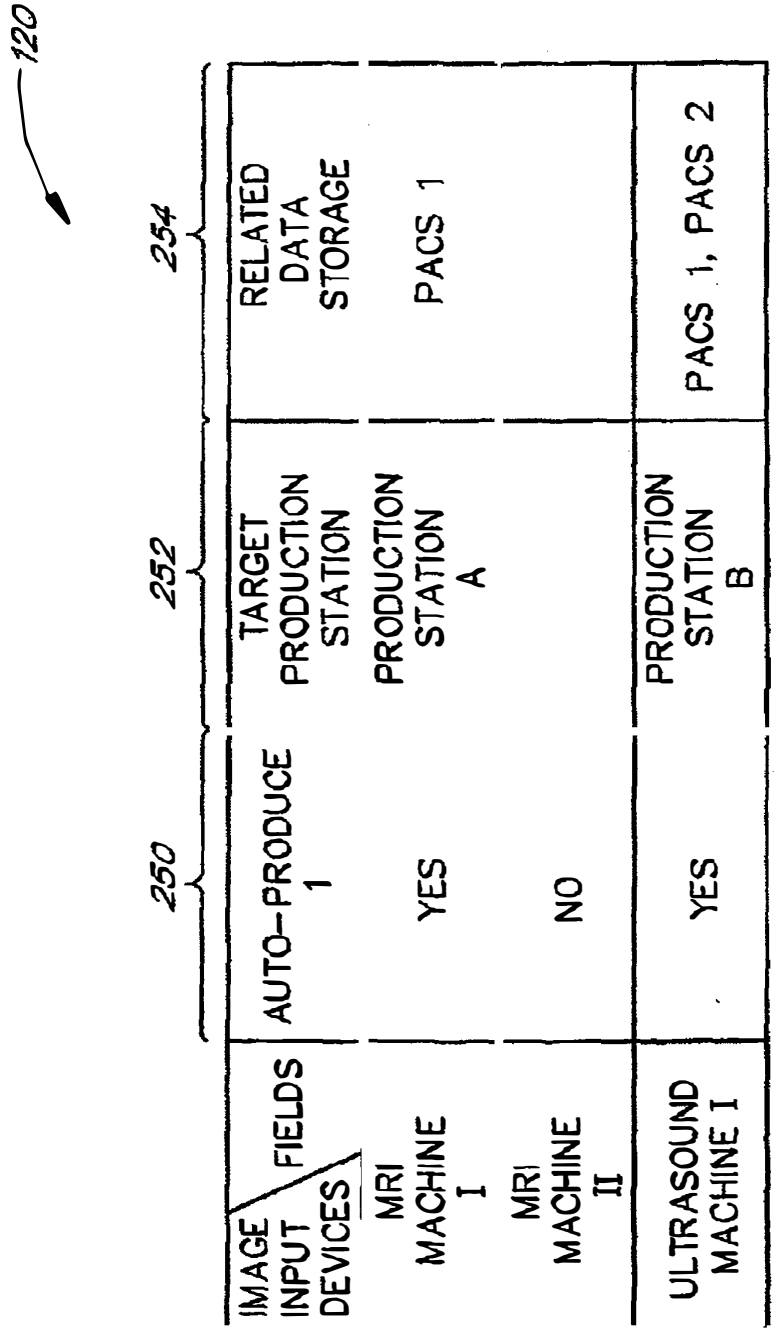
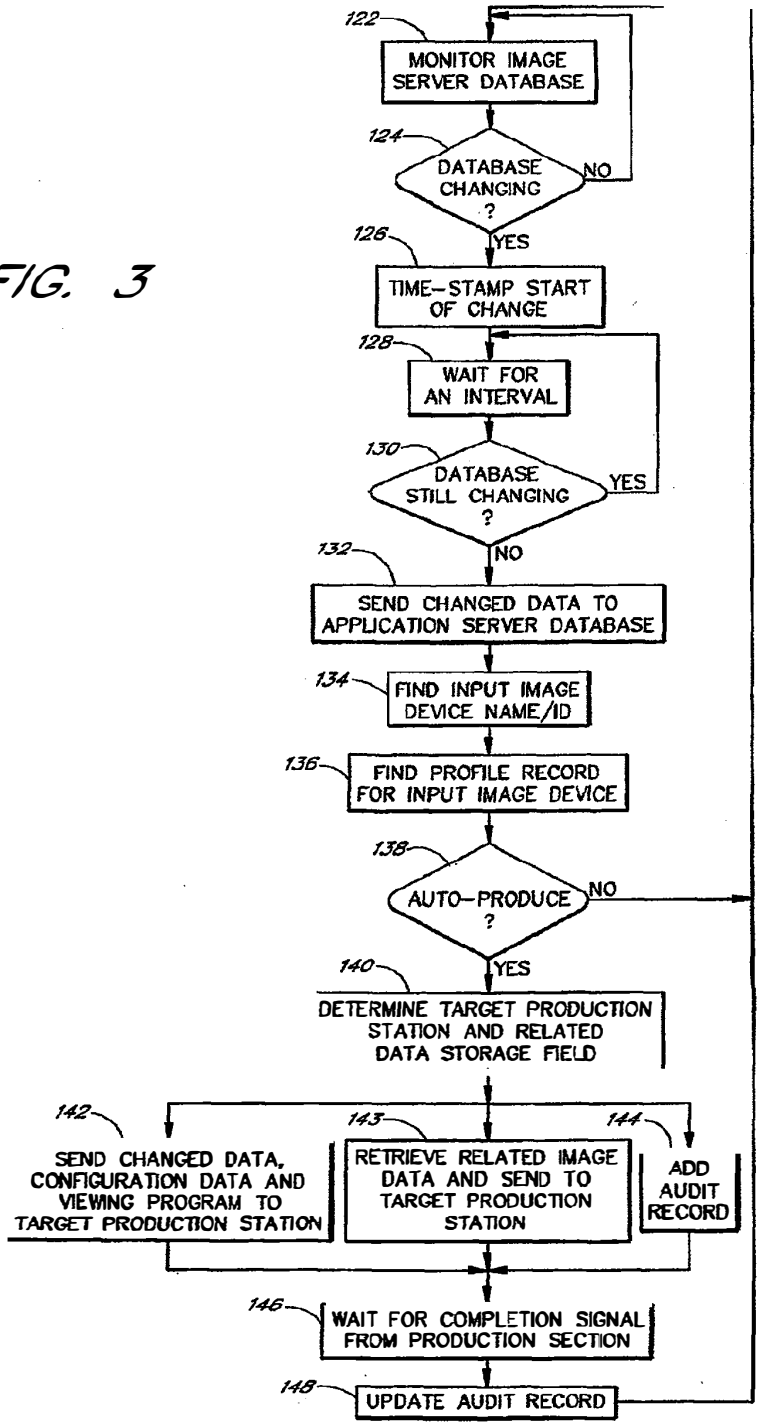


FIG. 2

FIG. 3



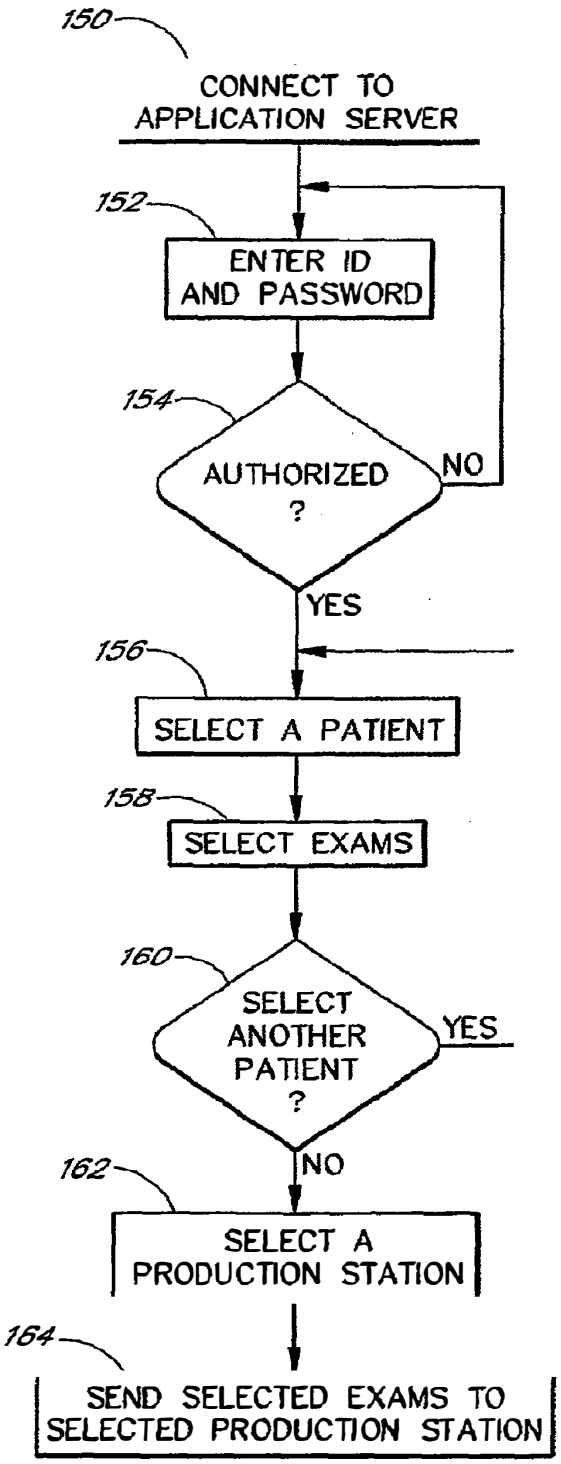


FIG. 4

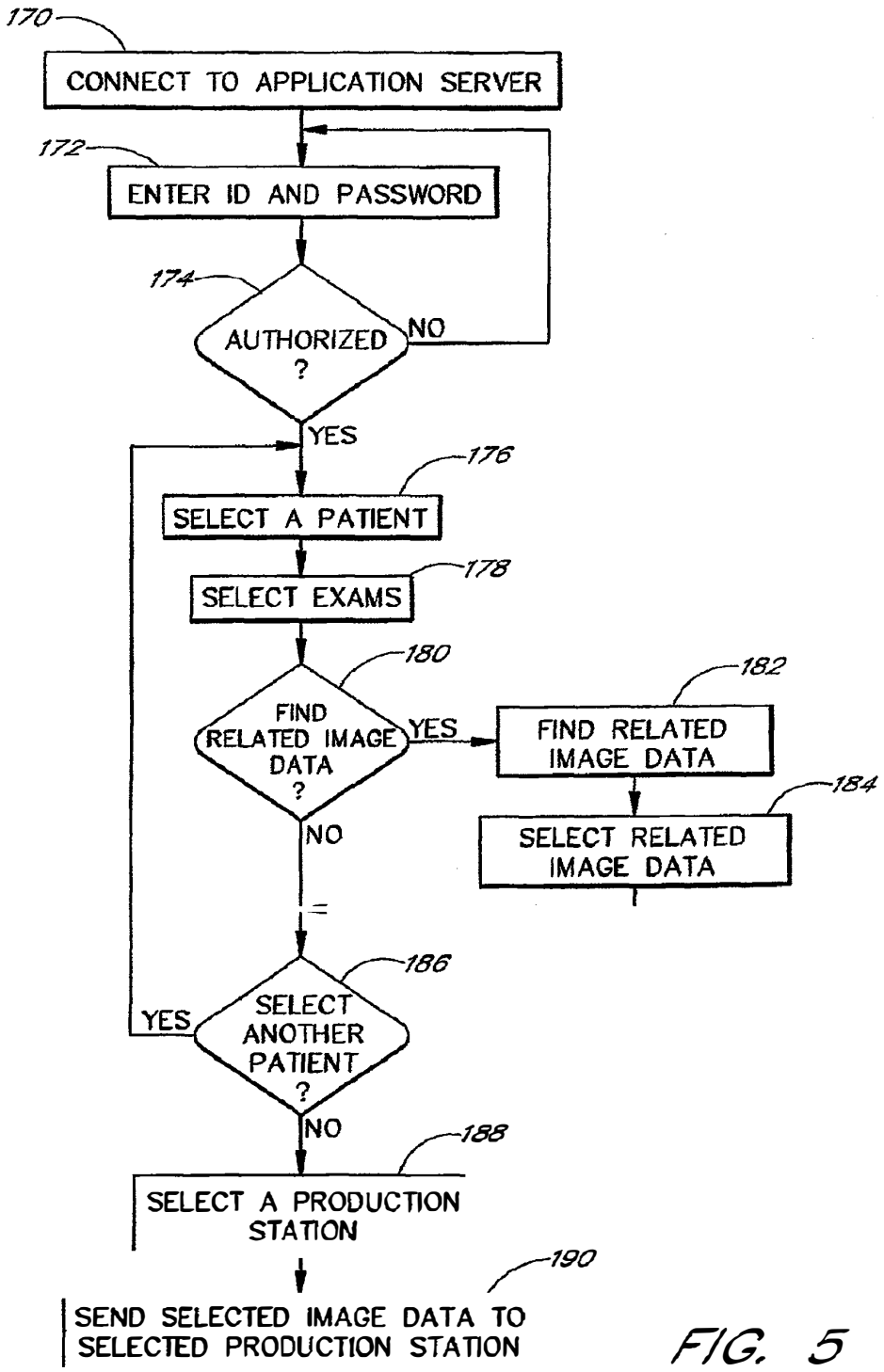


FIG. 5

SYSTEM AND METHOD FOR PRODUCING MEDICAL IMAGE DATA ONTO PORTABLE DIGITAL RECORDING MEDIA

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 11/942,630, filed on Nov. 19, 2007, which is a continuation of U.S. patent application Ser. No. 09/761,795, filed on Jan. 17, 2001, now U.S. Pat. No. 7,302,164, issued Nov. 27, 2007, which claims priority to U.S. Provisional Patent Application 60/181,985, filed on Feb. 11, 2000. The entire disclosures of these applications are hereby incorporated by reference herein in their entirety.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a system and method for the production of medical image data on portable digital recording media such as compact discs. More particularly, it relates to a system and method for receiving medical image data, processing medical image data, and transmitting medical image data to be recorded on a portable digital recording medium.

2. Description of the Related Art

Since the invention of the x-ray film, film has been the predominant multipurpose medium for the acquisition, storage, and distribution of medical images. However, the storage and distribution of film often requires considerable expenses in labor and storage space.

Today's modern hospitals utilize computer-aided imaging devices such as Computed Tomography (CT), Digital Subtracted Angiography, and Magnetic Resonance Imaging (MRI). These digital devices can generate hundreds of images in a matter of seconds. Many hospitals require these images to be printed on film for storage and distribution. To print complete sets of medical images from these digital devices, the cost in film material, storage space, and management efforts is often very high.

Some radiology departments have installed digital image storage and management systems known as PACS (Picture Archive Communication Systems). PACS are capable of storing a large amount of medical image data in digital form. PACS are made by manufacturers including GE, Siemens, and Fuji.

To ease the communication of data, the DICOM (Digital Imaging and Communications in Medicine) standard was developed by ACR-NEMA (American College of Radiology-National Electrical Manufacturer's Association) for communication between medical imaging devices and PACS. In addition to the examined images, patient demographics, and exam information such as patient name, patient age, exam number, exam modality, exam machine name, and exam date can also be stored and retrieved in DICOM compatible data format. A DICOM file stores patient and exam information in the header of the file, followed by the exam images. PACS store medical image data in DICOM format.

Digital medical image data can be stored on PACS and distributed using the Internet. However, many physicians' offices do not have the bandwidth suitable for fast download of medical image data. The concerns for medical data privacy and Internet security further reduce the desirability of Internet distribution.

SUMMARY OF THE INVENTION

The claimed system allows for digital medical image data to be produced on a portable digital recording medium such as a CD. A CD containing the medical image data can be distributed to physicians, hospitals, patients, insurance companies, etc. One embodiment of the claimed system allows for medical image data to be placed on a CD along with a viewing program, so that a user can use any computer compatible with the CD to view the medical image data on the CD. One embodiment of the claimed system allows for searching medical exam data that are related and placing such data on the same CD.

One embodiment of the claimed system comprises a receiving module configured to receive medical image data, a processing module configured to process the received medical image data, and an output module configured to transmit the processed medical image data to a production station configured to produce the transmitted medical image data on portable digital recording medium, such as a CD. In one embodiment, the output module transmits a viewing program configured to view medical image data to the production station so that the viewing program is produced on the same CD as the medical image data. In another embodiment, the CD already contains the viewing program before the medical image data is transmitted to the CD production station.

In one embodiment of the claimed system, the processing module is configured to create and store audit information of the portable digital recording medium produced by the production station.

In another embodiment of the claimed system, the processing module is configured to identify the originating image input device of the received medical image data, and determine, on the basis of the originating image input device, whether to transmit the received medical image data to a production station. The processing module also selects, on the basis of the originating image input device, one of multiple production stations as the target production station.

Yet another embodiment of the claimed system is configured to retrieve medical image data that are related to the received medical image data, and transmit the retrieved related image data to the production station. In one embodiment, exam images of the same patient are considered related. In another embodiment, exam images of the same patient and the same modality are considered related. For example, two x-ray exams on the left hand of the same patient are considered related. In yet another embodiment, exam images of the same patient, the same modality and taken within a specified date range are considered related. For example, two x-ray exams on the left hand of the same patient taken within a two-month period are considered related. A hospital may also determine other scenarios of relatedness.

One claimed method comprises the steps of connecting a browsing terminal to a computer database configured to store medical image data, selecting medical image data from medical image data stored on the database, and recording the selected medical image data on portable digital recording medium. In one embodiment, the claimed method also comprises a step of recording a viewing program configured to view medical image data on the portable digital recording medium.

One embodiment of the claimed method further comprises the steps of finding and retrieving medical image data that are

related to the selected medical image data, and recording related image data to portable digital recording medium.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates one embodiment of an image production system comprising an application server and portable digital recording medium production stations.

FIG. **2** illustrates sample records of one embodiment of an image input device profile table.

FIG. **3** illustrates a process of receiving image data from image server, processing received image data, and transmitting such data to the production station. This process also retrieves and transmits related image data for production.

FIG. **4** illustrates a process of a user selecting and ordering the production of image data stored on the application server.

FIG. **5** illustrates a process of a user selecting and ordering the production of image data stored on the application server, with the option of selecting and ordering the production of related image data.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** illustrates one embodiment of an image production system **100** comprising an application server **110** and one or more portable digital recording medium production stations **300**A, **300**B and **300**C. In the preferred embodiment, the production stations **300**A, **300**B and **300**C are CD (Compact Disc) production stations. Digital portable recording medium comprises CDs and DVDs (Digital Versatile Disc or Digital Video Disc). CDs may comprise CD-ROM (Compact Disc ReadOnly Memory), CD-R (Compact Disc Recordable), and CD-RW (Compact Disc Recordable and Writable). DVDs may comprise DVD-ROM (DVD Read Only Memory), DVD-R (DVD Recordable) and DVD-RAM (a standard for DVDs that can be read and written many times). Thus, although the following description refers primarily to CDs, those of ordinary skill in the art will understand that any suitable portable digital recording medium can be substituted for CDs.

The application server **110** is connected to one or more physician browsing terminals **400**A, **400**B and **400**C through a computer network **600**. Each physician browsing terminal **400**A, **400**B or **400**C comprises a browsing program such as Internet Explorer or Netscape Communicator. Physicians or their assistants launch the browsing program to access the application server **110** through the network **600** in order to select medical image data stored on the application server database **114** to be produced by a production station **300**A, **300**B or **300**C. In the preferred embodiment, the physician browsing terminals **400**A, **400**B and **400**C are connected to the application server through an Intranet. One embodiment of the Intranet utilizes TCP/IP network protocol. The Intranet can connect one radiology department, multiple departments within a hospital, or multiple hospitals. In another embodiment the browsing terminals **400**A, **400**B and **400**C are connected to the application server **110** through the Internet.

Still referring to FIG. **1**, the application server **110** is also connected to an image server **200**. The image server **200** is further connected to image input devices such as PACS **204**, MRI machines **206**, CT-scan machines **208**, ultrasound machines **210**, etc. In the preferred embodiment, the image server **200** is a DICOM image server configured to receive and store medical image data in DICOM format. In operation, the image server **200** receives medical image data from image input devices such as PACS **204**, MRI machines **206**, CT-scan machines **208** and ultrasound machines **210** and stores such image data in the image server database **202**. A high-resolution image scanner **500** is also connected to the image server **200**, so that medical image data stored on film can be scanned on the image scanner **500**, transmitted to the image server **200** and stored in the image server database **202**. In one embodiment, the image scanner **500** also converts the scanned image to DICOM format. The application server **110** receives input image data from the image server database **202**, processes the received image data, and sends the image data to one of the production stations **300**A, **300**B or **300**C to produce CDs.

The application server **110** comprises a viewing program **112**, an application server database **114** that stores image data received from the image server **200**, a production history database **116** that stores audit records on each CD produced, a display terminal **118** for programming and operating the application server **110** by a programmer or physician, and an image input device profile table **120**.

Still referring to FIG. **1**, the viewing program **112** is configured to allow users to read and manipulate medical image data. The viewing program **112** comprises multiple image manipulation functions, such as rotating images, zooming in and zooming out, measuring the distance between two points, etc. The viewing program **112** also allows users to read the patient demographics and exam information associated with the image data. The viewing program **112** used in the preferred embodiment is produced by eFilm Medical Inc. located in Toronto, Canada. The viewing program **112** used in the preferred embodiment is an abbreviated version with fewer functions and takes less storage space, in order to maximize the storage space for image data on a CD. The image server **200** used in the preferred embodiment is also made by eFilm Medical Inc.

The CD production stations **300**A, **300**B and **300**C in the preferred embodiment are produced by Rimage Corporation in Edina, Minn. Details about the Rimage CD production stations can be found in U.S. Pat. Nos. 5,542,768, 5,734,629, 5,914,918, 5,946,276, and 6,041,703, which are incorporated herein by reference in their entirety.

The application server **110** in the preferred embodiment runs on a personal computer running a 400 MHz Celeron or Pentium II/III chip, with Windows 98 or NT as the operating system.

FIG. **2** illustrates sample records of one embodiment of an image input device profile table **120**. The image input device profile table **120** contains a profile record for each image input device. Each image input device's profile record comprises: (1) an "auto-produce" logical field **250** indicating whether medical image data from this image input device should be produced on CD automatically by the image production system **100**, (2) a "target production station" field **252** identifying one of the production stations **300**A, **300**B or **300**C on which medical image data is to be produced, and (3) a "related data storage" **254** field identifying the medical image data storage units in which to search for the related image data. A medical image data storage unit is a storage unit that stores medical image data and is connected to the application server **110**. In one embodiment, a medical image data storage unit is connected to the application server **110** through the image server **200**. In the preferred embodiment, PACS **204** is such a medical image data storage unit.

In FIG. **2**, the sample profile table **120** contains profile records for MRI Machine I, MRI Machine II, and Ultrasound Machine I. For MRI Machine I, the "auto-produce" field **250** contains a "yes" value, directing the image production system **100** to automatically produce image data originating from MRI Machine I on portable digital recording medium. Its

"target production station" field **252** contains a "Production Station A" value, directing the image production system **100** to produce image data originating from MRI Machine I on production station A. Its "related data storage" field **254** is "PACS I", directing the image production system **100** to retrieve related medical image data from PACS I. For MRI Machine II, the "auto-produce" field **250** is "no", directing the image production system **100** to not automatically produce image data originating from MRI Machine II on portable digital recording medium. Since image data from MRI Machine II will not be automatically produced, the "target production station" field **252** and the "related data storage" field **254** are irrelevant. For Ultrasound Machine I, the "auto-produce" field **250** is "yes", and its "target production" field **252** is "Production Station B". Its "related data storage" field **254** contains a value of "PACS I, PACS II", directing the image production system **100** to search PACS I and PACS II for related medical image data.

FIG. **3** illustrates a process of the application server **110** receiving image data from the image server **200**, processing the received image data, and transmitting such data to the production station **300**A, **300**B or **300**C. The application server **110** continuously monitors the image server database **202** in step **122**. In one embodiment, the application server continuously "pings" the network address corresponding to the image server **200** on the network that connects the application server **110** with the image server **200**.

Still referring to FIG. **3**, the application server **110** determines if the image server database **202** is changing, in step **124**. In the preferred embodiment, the application server **110** makes that determination by detecting whether the image server database **202** is increasing in size. If there is no change in the image server database **202**, then the application server **110** returns to step **122** to continue monitoring. If there is change in the image server database **202**, then the application server **110** proceeds to step **126** and time-stamps the moment that the change started. The application server **110** then proceeds to step **128** and waits for an interval, typically 35 to 65 seconds. After the interval, the application server **110** checks whether the image server database **202** is still changing, in step **130**. If the image server database **202** is still changing then the application server **110** returns to step **128** to wait for another interval. If the image server database **202** is no longer changing, then the application server **110** proceeds to step **132** and copies the data changed since the time-stamped moment. This changed data is copied from the image server database **202** to the application server database **114**.

The application server **110** proceeds to step **134** and finds the input image device name or identification number from the newly received image data. In the preferred embodiment, image data from the image server database **202** are stored in DICOM format, and the input image device name or identification number is stored in the header of the DICOM format image data file. The input image device name/ID indicates the origin of the newly received data. The application server **110** proceeds to step **136** and uses the found input image device name/ID to find a corresponding profile record in the image input device profile table **120**. If the profile record has an "auto-produce" field **250** with a "no" value, the application server **110** returns from step **138** to step **122** to continue monitoring the image server database **202**. If the "auto-produce" field **250** contains a "yes" value, the application server **110** proceeds from step **138** to step **140**, and determines the target production station **300**A, **300**B or **300**C from the "target production station" field **252** of the profile record. In step **140**, the application server **110** also determines the value in the "related data storage" field **254** of the profile record.

Still referring to FIG. **3**, in step **142**, the application server **110** sends a copy of the newly received data, along with a copy of the viewing program **112**, to the target production station **300**A, **300**B or **300**C identified in step **140**. With the viewing program attached, the image data on each CD produced by the target production station **300**A, **300**B or **300**C can be viewed on any computer that accepts the CD, regardless of whether that computer has its own viewing program installed. In one embodiment, the data received in step **132** is stored in the application server database **114** before it is transmitted to the target production station **300**A, **300**B or **300**C in step **142**. In another embodiment, the application server **110** transmits the data received in step **132** to the target production station **300**A, **300**B or **300**C, without storing a copy of the data in the application server database **114**.

In one embodiment, the application server **110** does not send a copy of the viewing program **112** to the target production station during step **142**. Rather, the application server **110** sends a copy of the received medical image data to the production station **300**A, **300**B or **300**C to be recorded on pre-burned CDs. Each pre-burned CD contains a viewing program already recorded onto the CD before step **142**.

In step **142**, the application server **110** also sends configuration data to the target production station **300**A, **300**B or **300**C. The configuration data comprises a label-printing file comprising the specification for printing labels on top of the CDs, and a "number of copies" value indicating the number of copies of CDs to be produced. A typical specification in the label-printing file may specify information such as patient name, exam modality, hospital name, physician name, production date, etc. to be printed by the target production station as a label on the top of each CD produced.

Still referring to FIG. **3**, in step **143**, the application server **110** searches the application server database **114** for image data related to the newly received data. The application server **110** then searches the PACS systems identified in the "related data storage" field **254** in step **140** for data related to the newly received data. Some PACS systems each comprise a primary image data storage and an archive image data storage, and the application server **110** searches both the primary image data storage and the archive image data storage on these PACS systems. The application server **110** is connected to the PACS systems through the image server **200**. The application server **110** retrieves found related data from the PACS systems and stores a copy of such found related data in the application server database **114**. The application server **110** sends a copy of related data that are found from the application server database **114** or the PACS systems to the target production station **300**A, **300**B or **300**C. The medical image data originally received in step **132** and the related medical image data are produced by the target production station **300**A, **300**B or **300**C on the same CDs for comparative study.

For each CD to be produced, the application server **110** adds one audit record to the production history database **116** in step **144**. The new audit record comprises the identification number of the CD and other relevant information about the CD, such as the physician who requested the production (if any), and the names of the patients whose exam images are on that CD.

Steps **142**, **143** and **144** may be executed immediately before, concurrent with, or immediately after one another.

The target production station **300**A, **300**B or **300**C produces the CDs containing the medical image data and the viewing program sent to it, and prints a label on top of every CD, corresponding to the specification in the label-printing file. The number of CDs produced corresponds to the "number of copies" number sent by the application server **110** in

step **142**. When the target production station has produced the CDs, the production station returns a "completed" signal to the application server **110**. The application server **110** waits for this signal in step **146**.

Still referring to FIG. **3**, in step **148**, the application server **110** updates the audit records in the production history database **116** that were created in step **144**. For each CD produced, the application **110** server updates the date and time of production for that CD's audit record. The application server **110** also updates the status value for that CD's audit storage record from "processing" to "successful". The application server **110** then continues monitoring the image server database **202** as in step **122**.

FIG. **4** illustrates a process of a user selecting and ordering the production of image data stored on the application server **110**. A user, typically a physician or physician's assistant, accesses the application server database **114** from a browsing terminal **400**A, **400**B or **400**C connected to a network **600**. In one embodiment, the user launches a browser such as Microsoft Internet Explorer or Netscape Communicator, and specifies a network address corresponding to the application server **110**, in step **150**. In another embodiment, the user clicks a pre-defined icon that directly launches a browser connecting to the application server **110**. The application server **110** prompts the user to enter a password or an identification name coupled with a password, in step **152**. The application server **110** checks if the entered identification/password is authorized in step **154**. If the entered identification/password is not authorized the user is returned to step **152** to re-enter the identification/password, or disconnected from the application server **110**. If the entered identification/password is authorized then the user is allowed access to the application server database **114** and the application server **110** proceeds to step **156**.

Still referring to FIG. **4**, in step **156** the user is prompted to select a patient from a list of patients with exam images in the application server database **114**. The user is then shown a list of the selected patient's exams, and is prompted to select one or more exams of that patient, in step **158**. When the user indicates that he/she has completed selecting all exams for that patient, the user is asked in step **160** whether to select another patient from the list of patients. If the user answers "yes", the user is returned to step **156** to select another patient. If the user answers "no", the user proceeds to step **162**.

In another embodiment, when a user selects a patient, all exams belonging to that patient will be automatically selected without prompting for user selection. In yet another embodiment, the user is not prompted to select patients, but is only prompted to select exams from a list of all exams for all patients contained in the application server database **114**.

When the user indicates that he/she has completed selecting, the user is prompted to select a production station from a list of production stations **300**A, **300**B and **300**C in step **162**. The user is also prompted to enter additional label text to be printed as labels on the CDs to be produced, to supplement the text printed according to the specification of the label-printing file. The user can advantageously select the production station located closest to his/her office. In one embodiment, only one production station is connected to the application server **110**, and the lone production station will be the selected production station without prompting for user selection.

In one embodiment, the user is also prompted to select the number of copies of CDs to be produced. In another embodiment, the number of copies is set at one without prompting for user direction. As described above in connection with FIG. **3**, in step **164**, the application server **110** sends a copy of the image data of the selected exams for the selected patients to the selected production station, along with a copy of the viewing program **112**, and configuration data comprising a label-printing file, additional label text, and a number indicating the number of copies of CDs to be produced. The production station **300**A, **300**B or **300**C then produces one or more CDs containing the selected exams for the selected patients and the viewing program, with labels printed on top of the CDs according to the specification in the label-printing file and the user-entered additional label text.

In another embodiment, a user accesses the application server database **114** not from a browsing terminal **400**A, **400**B or **400**C, but directly from the display terminal **118**. In this embodiment the user directly proceeds from step **152**. In this embodiment the user is typically a programmer or operator of the image production system **100**.

FIG. **5** illustrates a process of a user selecting and ordering the production of image data stored on the application server **110**, with the additional option of selecting and ordering the production of related data for comparative study. As described above in connection with FIG. **4**, a user connects to the application server **110** from a browsing terminal **400**A, **400**B or **400**C in step **170**. The user enters identification information and a password in step **172**. Step **174** determines whether the user is authorized to access the application server database **114**. If authorized, the user is prompted to select a patient in step **176**, and selects exams of the selected patient in step **178**. The user is then asked in step **180** if he/she desires to find related data of that patient for comparative study.

If the user answers yes, the application server **110** then searches for related data. The application server **110** finds the image input device profile table **120** profile record corresponding to the image input device from which the selected data originates, identifies the list of PACS systems stored in the "related data storage" field **254**, and searches these PACS systems for related data. In another embodiment, once the user has selected a patient/exam combination, the application server **110** automatically searches for related data without asking for user direction. In this embodiment, the application server **110** alerts the user if related data are found. In one embodiment, the application server **110** also searches the application server database **114** for related medical image data.

Still referring to FIG. **5**, the user is then prompted to select all or some of the related data from the list of found related data for production, in step **184**. In another embodiment, all found related data are automatically selected by the application server **110** for production, without prompting for user selection.

The user is then prompted to select another patient in step **186**. After the user has completed selecting all patients, the user is prompted to select a CD production station **300**A, **300**B or **300**C in step **188**. The user is also prompted to enter additional label text. In step **190**, the application server **110** then sends a copy of the original and selected related data, along with a copy of the viewing program **112**, a number indicating the number of copies to be produced, additional label text, and a label-printing file to the selected production station **300**A, **300**B or **300**C for production.

The above paragraphs describe the application server **110** with one database **114** for image data storage. In another embodiment, the application server **110** includes two databases for image data storage: a new data database and a storage data database. The new data database stores only the most recent batch of new data just received from the image server **200**. After the data in the new data database is sent to a production station **300**A, **300**B or **300**C, the application

server **110** erases data in the new data database. The storage data database stores all data that has ever been received from the image server database **202**. In the processes described by FIG. **4** and FIG. **5**, a user selects images for production from the storage data database.

Several modules are described in the specification and the claims. The modules may advantageously be configured to reside on an addressable storage medium and configured to execute on one or more processors. The modules may include, but are not limited to, software or hardware components that perform certain tasks. Thus, a module may include, for example, object-oriented software components, class components, processes methods, functions, attributes, procedures, subroutines, segments of program code, drivers, firmware, microcode, circuitry, data, databases, data structures, tables, arrays, and variables. Modules may be integrated into a smaller number of modules. One module may also be separated into multiple modules.

Although the foregoing has been a description and illustration of specific embodiments of the invention, various modifications and changes can be made thereto by persons skilled in the art, without departing from the scope and spirit of the invention as defined by the following claims.

What is claimed is:

1. A system comprising:

a medical image server configured to receive medical image data generated by one or more imaging modalities, the medical image data being formatted in a standard medical imaging format;

a database configured to store medical image data generated by the one or more imaging modalities;

a plurality of browsing terminals configured to receive a user selection that defines selected medical image data for a patient;

a search module configured to automatically search the database for related data based on the user selection; and

a production station that is configured to record all of the following onto a data storage medium:

the selected medical image data for the patient, recorded in the standard medical imaging format, the related data, and a viewing program that is configured to allow viewing of medical image data that is recorded onto the data storage medium by a general purpose computer that is not specifically configured with medical imaging software for viewing of medical images formatted in the standard medical imaging format.

2. The system of claim **1**, further comprising a configuration data module configured to allow a user to input identifying information relating to the selected medical image data.

3. The system of claim **2**, wherein the production station is configured to produce a label for the data storage medium, the label containing the identifying information.

4. The system of claim **1**, further comprising an audit module that is configured to automatically provide an auditable trail of the selected medical image data.

5. The system of claim **4**, wherein the auditable trail of the selected medical image data includes a record of when the selected medial image data and the related medical image data were recorded onto the data storage medium.

6. The system of claim **4**, wherein the auditable trail of the selected medical image data includes identifying information corresponding to the production station used to record the selected medial image data and the related data onto the data storage medium.

7. The system of claim **1**, wherein the data storage medium is an optical disk.

8. A method of recording medical image data and related data onto a data storage medium, the method comprising:

receiving medical image data from one or more imaging modalities, the received medical image data being formatted in a standard medical imaging format;

storing the received medical image data in a database;

receiving a user selection that defines selected medical image data for a patient;

automatically searching the database for related data based on the user selection;

recording the selected medical image data for the patient and the related data onto a data storage medium using a production station, the selected medical image data being recorded on the data storage medium in the standard medical imaging format;

recording a viewing program onto the data storage medium using the production station, the viewing program being configured to allow viewing of medical image data stored on the data storage medium on a general purpose computer that is not specifically configured with medical imaging software for viewing of medical images formatted in the standard medical imaging format; and

labeling the data storage medium with a label that includes identifying information associated with the selected medical image data.

9. The method of claim **8**, wherein the user interface is further configured to collect the identifying information from the user.

10. The method of claim **8**, further comprising generating an auditable trail of the selected medical image data, wherein the auditable trail includes a record of when the selected medial image data and the related medical image data were recorded onto the data storage medium.

11. The method of claim **8**, wherein receiving a user selection comprises selecting one or more patients from a list of patients having medical image data stored in the database.

12. The method of claim **8**, wherein the plurality of imaging modalities includes an image scanner configured to generate medical image data in a DICOM-compatible format from film.

13. The method of claim **8**, wherein the data storage medium is an optical disk.

14. The method of claim **8**, wherein recording the selected medical image data and the related data further comprises selecting a production station from a plurality of production stations that are connected to the database via a computer network.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 7,783,174 B2
APPLICATION NO. : 12/484100
DATED : August 24, 2010
INVENTOR(S) : Wright et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Column 2, Page 3 (Item 56), Line 17, under Other Publications, change "BringharnRAD:" to --BringhamRAD:--.

In Column 2, Page 3 (Item 56), Line 37, under Other Publications, change "Johnson," to --Johnston,--.

In Column 2, Page 4 (Item 56), Line 43, under Other Publications, change "at al.," to --et al.,--.

In Column 1, Page 5 (Item 56), Line 42, under Other Publications, change "EurIPACS," to --EuroPACS,--.

In Column 2, Page 5 (Item 56), Line 14, under Other Publications, change "DeJamette" to --DeJarnette--.

In Column 2, Page 5 (Item 56), Line 16, under Other Publications, change "Entwickiung" to --Entwicklung--.

In Column 1, Page 6 (Item 56), Line 58, under Other Publications, change "AcculmageTM" to --Accuimage--.

In Column 1, Page 7 (Item 56), Line 67, under Other Publications, change "HIPPA"," to --HIPAA",--.

In Column 2, Page 7 (Item 56), Line 1, under Other Publications, change "et all," to --et al.,--.

In Column 1, Page 10 (Item 56), Line 57, under Other Publications, change "Mitre" to --Mitra--.

In Column 1, Page 10 (Item 56), Line 63, under Other Publications, change "Mitre" to --Mitra--.

In Column 2, Page 10 (Item 56), Line 38, under Other Publications, change "radiographics.rsnajnls.orq" to --radiographics.rsnajnls.org--.

Signed and Sealed this
Twenty-ninth Day of March, 2011

David J. Kappos

David J. Kappos
Director of the United States Patent and Trademark Office

CERTIFICATE OF CORRECTION (continued)
U.S. Pat. No. 7,783,174 B2

In Column 1, Page 11 (Item 56), Line 36, under Other Publications, change ""Medlmage" to --"Medimage--.

In Column 1, Page 11 (Item 56), Line 44, under Other Publications, change "Desecription" to --Description--.

In Column 2, Page 11 (Item 56), Line 38, under Other Publications, change "Medlmage" to --Medimage--.

In Column 2, Page 11 (Item 56), Line 43, under Other Publications, change "MBA,," to --MBA.,--.

In Column 1, Page 12 (Item 56), Line 15, under Other Publications, change "Servise" to --Service--.

In Column 1, Page 12 (Item 56), Line 22, under Other Publications, change "Mitre" to --Mitra--.

In Column 1, Page 12 (Item 56), Line 28, under Other Publications, change "Mitre" to --Mitra--.

In Column 1, Page 12 (Item 56), Line 37, under Other Publications, change "Mitre" to --Mitra--.

In Column 1, Page 12 (Item 56), Line 45, under Other Publications, change "Mitre" to --Mitra--.

In Column 2, Page 12 (Item 56), Line 55, under Other Publications, change "Perfectlmage" to --Perfectimage--.

In Column 1, Page 13 (Item 56), Line 44, under Other Publications, change "Mitre" to --Mitra--.

In Column 2, Page 13 (Item 56), Line 48, under Other Publications, change "BaSed" to --Based--.

In Column 2, Page 14 (Item 56), Line 46, under Other Publications, change "Medial" to --Medical--.

In Column 1, Page 15 (Item 56), Line 4, under Other Publications, change "Gmbh," to --GmbH,--.

In Column 1, Page 15 (Item 56), Line 21, under Other Publications, change "Medlmage" to --Medimage--.

In Column 1, Page 15 (Item 56), Line 32, under Other Publications, change "Advertist" to --Adventist--.

In Column 1, Page 15 (Item 56), Line 36, under Other Publications, change "Medlmage" to --Medimage--.

In Column 1, Page 15 (Item 56), Line 38, under Other Publications, change "MedImage" to --Medimage--.

In Column 1, Page 15 (Item 56), Line 40, under Other Publications, change "MedImage" to --Medimage--.

In Column 10, Line 1, in Claim 5, change "medial" to --medical--.

In Column 10, Line 6, in Claim 6, change "medial" to --medical--.

In Column 10, Line 41, in Claim 10, change "medial" to --medical--.

CERTIFICATE OF SERVICE

I certify that on July 24, 2013, this BRIEF OF PLAINTIFF-APPELLANT DATCARD SYSTEMS, INC. was filed electronically using the CM/ECF system and served via the CM/ECF system on counsel of record for Defendant-Appellee, Pacsgear, Inc., as follows:

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